

A Database Publication

ATARI USER

Vol 1 No 1

May 1985

£1

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computers
are here!*

*In-depth preview
of the new Atari
XE and ST series*

**Tramiel heralds a new era
in personal computing**

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Let's introduce ourselves...

WELCOME to the first edition of Atari User — the exciting new magazine for the whole range of Atari machines, written by Atari users for Atari users.

For years now our Atari aficionados have known that Atari's tremendous graphics and sound capabilities — plus the wide variety of add-ons and software — put them in a league of their own.

Now many more discerning third users are waking up to this fact and interest in Atari is soaring.

The latest Atari machines promise to totally dominate both the 8 bit and 16 bit fields. They are the most exciting microcomputer developments we've seen for a long time — so you'll gather from our previous. The tremendous interest shown

in these new models can only benefit users of the established range of Atari machines.

Certainly Atari User will be catering for all Atari machines, old and new. Each issue will be packed with informative features, full length listings, hints and tips, hardware and software reviews and all the latest news from the ever-expanding world of the Atari. Whether an experienced user, you'll always find something of personal interest to you in our pages.

Don't forget, though, this is your magazine. We're always willing to listen to your suggestions, so let us know what you want to see in our pages.

And we're on the lookout for new writers, too. If you have an article or program that would interest us, please let us know.



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The dramatic change in Atari's fortunes has been due to one man — Jack Tramiel. This human dynamo is the best-known figure in the world of personal computing — and the most controversial. The executive of Amstrad who created Commodore, built it into a computing giant, raised Amstrad prices doubling, and raised Atari with \$30 million of his own and a guarantee of an additional \$10 million. The story of Tramiel and how he fought his way to the top — and intends to stay there — is told by

MIKE COWLEY



The Man...aiming for another billion

A FORMER Commodore employee who ran ahead of Jack Tramiel was asked whether or not his ex-boss would make a good President of the United States.

The trouble with Jack, he replied, is that while he certainly has the ability, he just isn't democratic enough. Although he likes to do things for the people he wouldn't want to be answerable to them.

This may simply have been a case of sour grapes. After all Tramiel's former mill showed up on the seat of the executive's trousers. But even those closest to Jack readily admit that he sometimes comes across like a wounded elephant trampling underfoot everyone and everything in his path.

And that is why the new boss of Atari has the reputation of being the most feared — yet at the same time most respected — personality in the computer industry today.

When Jack Tramiel is around, he isn't just a man in the language of the press: he's THE man — and you'd better believe it.

At the end of a corporate battle

involving the head of the Tramiel clan it is said that he will not walk away until his victims' blood is splattered on the walls and the ceiling as well as the floor.

It is this ruthless approach — some would argue it's just good business — which enabled him to lead Commodore to become the first personal computer company to pass the magic \$1 billion turnover milestone.

And now he intends to serve up the same for Atari, the company which he led previously helped to bring to its knees.

Not that Jack Tramiel is overly concerned with what people say about his methods. His only care for being a winner — so that end result for him will always justify the means.

I believe business is war — is one of the Atari chief's favourite sayings. No one who knows him doubts he would.

Once asked to comment on the high turnover of executives while he reigned at Commodore — the standing joke at the time was you get a gold watch if you lasted a year — he said: "Our general idea is in the trenches —

so more of them get killed.

However, when Jack Tramiel comes out on top he's not the only winner. For his entire business philosophy is based on the belief that the only way to make money is to give the customer true value.

It's far more than anything else about Tramiel which bodes well for anyone who ever bought an Atari or is even thinking about buying one — an industry observer told me.

With Jack, you know he'll be in your corner fighting all the way. He is a street fighter from way back, and if he loses a few more executives than most along the way he won't lose any sleep about it.

However, those of his lieutenants who survive the rigours of the campaigns are richly rewarded for the absolute loyalty, supreme expertise and total commitment demanded.

Many people at Commodore smiled as millionaires in their own right then as in any other high-tech corporation in Silicon Valley. Bonus payments of up to 100 per cent of salary plus

substantial allocations of shares now to that.

"There's a touch of the godfather about Jack," said yet another Commodore man whose name never made the corporate roll of honour.

"He generously knows no bounds, but neither does his wrath. You may not end up wearing a corporate sweater, but the message is much the same.

Bald and round at 55 years of age, Jack Tramiel could be mistaken for somebody's favourite uncle. In fact he would not seem out of place dishing out legends and lore behind the counter of a deli-casino.

It's only those heavily-lidded, shrewd eyes which provide the clue that here is a man whose character has been forged on the steel of adversity — a man to be reckoned with.

As benefits a former New York, cable. It doesn't take long to figure out that doing business with him will mean paying full fare — and not getting any change.

Yet those people who respect Jack Tramiel to surround himself with sycophants would be way off mark. For he enjoys nothing more than confrontation — "the more, the better" — with members of his team.

Constantly purchasing his remarks by leaning his fist on the desk top, he demands ever more from his staff: passed swiftly. And with him it is argument he seeks, not discussion.

The people he most likes to have around him are the brilliant mavericks who do not always follow the rules.

Jack Tramiel, you see, is not entirely sold on rules. For rules often become orders which must be obeyed. And these in turn, have been known to become excuses for some of the worst abuses of human behaviour.

And the young Jack knew only too well about these. Born in Poland, he was provided with a "ticket to hell" at the age of 11 when a number was burned into his flesh on anti-Nazi Auschwitz.

He managed to survive the war as a slave labourer working on road construction — "they had to feed us or we would have been able to work."

Somewhat surprisingly, Jack Tramiel insists he does not hate either the Germans or Germany today. In fact he chose to build a factory there

close to an ex-convict on which he had worked.

Asked why he would provide employment for the people who persecuted him once he arrived, simply "I live in the future."

At the end of the war he moved to the United States, joined the army there and learned to repair typewriters. It was the skill which was to set him on the road to joining the ranks of North America's self-made immigrant millionaires.

His wasn't to be an overnight rise to riches, story however.

Once he became a millionaire again he used his newfound skill to launch his



"We make computers for the masses, not the classes!"

own typewriter business in the tough, tenement Bronx neighbourhood much loved as the backdrop for gangster films.

Always an opportunist, he became one of the first to realise the potential of electro-mechanical adding machines.

In the mid-fifties Jack Tramiel and his wife Helen headed north to Toronto to open Everest Office Machines.

Securing the rights to a line of Czechoslovakian typewriters made the fledgling company so successful that it went public in 1962. And as the Commodore Portable Typewriter Corporation was born.

Three years later it nearly collapsed when its major backer, C.P. Margen, was found to have built his business empire on fraudulent loans in the wake of the adverse publicity Commodore was unable to get credit.

It was only an appeal by Jack Tramiel to investor Irving Gash

which resulted in the company being listed on the eleven-hour.

To persuade the money man to come up with the money Jack turned over all of his stock with the proviso that some of it — an underwritten amount — was to be returned once Commodore was back on its feet.

It was only a matter of months before Jack Tramiel found himself once more with a pile of the stock. So he adjusted his corporate gun ahead and came out of the Commodore game fighting.

Steering the company into the lucrative but volatile calculator market, he suddenly found himself at war for the first time with the big boys.

Texas Instruments was to eventually win the ugly battle for the main American market, leaving Jack Tramiel bloodied but unbowed. For he had already conceived the idea which was to enable him to make a triumphant comeback — a cheap computer for the masses.

Having at one time briefly considered buying Apple, he opted out in favour of setting up his own development team. And such was the excitement generated when he eventually unveiled the Commodore Pet that customers fell over themselves to pay for it in full in advance — then wait six months for delivery.

It wasn't long after that he decided to invade Europe, a place for which he has always had a soft spot.

Jack Tramiel remains convinced that the Europeans are much more appreciative of value for money than their flesh American cousins — and that is what he was offering.

With no real competition facing Commodore in Europe in the late 70s, he was soon able to capture 80 per cent of the market in the UK and Germany.

So with booming sales on both sides of the Atlantic, his much quoted saying "We make computers for the masses not the classes" became a fact of life.

In fact it was during Commodore's heyday that Jack Tramiel earned himself the reputation of being the source of memorable phrases.

"Business is like sex," he once told an interviewer. "You have to be involved."

And when discussing the possible threat of the MSX machines he was moved to utter "The Japanese are

coming — so we will become the Japanese."

Yet it is his almost God-like commitment to Moses plans — it will be done — which still echoes in the ears of his former colleagues.

When Jack Tramiel resigned from Commodore after an apparent disagreement with Gould which were exacerbated through the industry for months.

Now that Jack is back — this time at Atari — nothing much seems to have changed. Already members of his former Commodore clan — even some he unconsciously dumped — have been clamouring to get back on board such as the chairman of the firm.

When Warner Communications relinquished control of Atari to Tramiel few tears were shed. After all the company had lost \$500 million in

1983. But the new boss is already forecasting billion dollar profits.

To achieve this he was soon seen to be resorting to his well proven methods. Within a month of taking over he had taken up the hardware to reduce Atari's world-wide staff from 15,000 to 1,500.

Bodies were strewn everywhere, meaning one of the departments in the 40 buildings in the San Diego Atari empire only seven still remain.

To ensure he maintains a permanent empire on his new company, Jack Tramiel has placed his three sons in key executive positions.

Not that nepotism influenced his decision as Sam, Leonard and Gary are all first-class executives in their own right. But their arrival has satisfied his Jewish desire for a close knit family unit. Yet his "family" is not

simply restricted to blood relatives for he looks on every member of the Tramiel "war cabinet" as part of his immediate household.

No one — and that includes himself — will ever be found flying first class on company business.

In essence this is a reflection of the private face of Jack Tramiel, the man who enjoys nothing better than being at home with his wife eating Polish peasant food.

But a very close second comes his enormous appetite for business.

Now that he is armed with his new ST range of computers he needs the confidence of the general who has just been provided with the world's first nuclear missiles.

And with his finger on the button, the Apple of the world had better watch out.

Future looks very, very rosy

THE Atari computer is designed from the outset to be a complete personal computer, where virtually no extras are required to give you the facilities you want and need in a home computer.

For example this article was written on an Atari 800X, 844 computer — whose keyboard is a joy to use — using Atariwriter, the excellent cartridge-based word processor program which even works on a 128 Atari using only cassette, if necessary for data storage.

Many Atari owners are already aware of the chequered history of the company in the US, where the out-throat competitive nature of the home computer market has seen the exit of Texas, Texas and Mafel from the battlefield over the last couple of years.

Now with Jack Tramiel's takeover of Atari with his "business is war" philosophy the company's expansion plans are based upon a distinct value-for-money policy where popular pricing rules the road.

In Britain unfortunately, Atari has always been regarded, purely in terms of computer sales, as less successful than other UK based companies, probably due to the old pricing policy where C100 to C300 was the Atari norm.

So the best home computer

By PHILIP MORRIS,
Oxford, English Software

available last out to the Spectrum the Via 20 and the Commodore 64 Source unbelievable doesn't it?

Anyway, the Lord works in mysterious ways, to quite a famous computer hacker and the rest is now history.

Jack Tramiel moves in, takes over Atari, brings down prices in one or two fell swoops making the best personal computer accessible to almost everybody.

OK, an Atari machine labelled with the games tag when in fact, most home computers are used for entertainment anyway — rendering the label now pretty meaningless.

If you feel the need to use your computer for something other than games playing, and believe me, we all feel that need sometimes, then the Atari will help you compose music, design multi-colour graphics images, type letters (and articles) and much, much more.

This is the perfect place to encourage correspondence from readers who are using their Atari computers for applications that others might not have even dreamed of.

Let us now shatter some common

myths — that for instance the Atari cannot reproduce digitised sampled sound in the same way the Commodore 64 can. Well in fact, yes it can. Games and other programs should be on the market this year that do feature high quality speech as an integral part of their action. Just wait and see.

Also, with the growth in the market for disc drives, the British Atari owner will fully begin to appreciate the great advantages of owning a reliable fast-access disc drive — fast, easy loading, and much more versatile than cassette.

Of course technology never stands still for more than 50 microseconds and the new Atari ST range represents a major step forward for Atari.

The future may lie in Atari's hands still — so where does that leave you the user?

Well, obviously the software companies will always provide an ample supply of exciting and interesting software with more and more UK companies now starting to manufacture add-ons and peripherals in much the same way as they do for other computers. cheaper RAM packs, cassette recorder interfaces, printer interfaces, and so on.

The future for Atari looks very very indeed. Roll on 1988.

THE ANATOMY OF THE ST

BRYAN WILLIAMS finds out why the new Atari ST machines are about to set the micro marketplace on fire

THE excitement surrounding the Atari ST range has not been seen in the computer industry for a long time. So what is it that has set the micro market on fire?

At the heart of the machine is the powerful Motorola 68000 microprocessor, already the de facto standard in 16/32 bit CPUs. Running at 8MHz, power and speed combine to give remarkable performance.

The new keyboard features a full typewriter layout with the addition of a cursor control section, a numeric keypad and 10 special function keys.

With the ST, Atari users have a built-in choice of language. The machine features not only a new version of Atari Basic but also Logo, the language much favoured in education because of its ease of use.

For machine language programmers the 68000 is the obvious choice for the new generation of machines features not only a new addressing modes and five different data types.

The three graphics modes give a choice of resolution. The hi-res colour display uses 320 x 200 dots with 16 colours on screen. The high resolution colour display uses 640 x 200 dots with four colours. For truly high resolution, the monochrome

display offers staggering 640 x 400 dot display.

Sound is also prominent on the ST's list of features. The sound generator has three separate voices, each with its own pitch and volume settings. Waveform shaping circuits make the notes sound as if they were played on a real instrument.

Another first for the ST is its built-in MIDI interface which allows it to control many synthesizers used by today's musicians.

There's also an RS232C serial port

WHEN it arrives in Britain, within the next few weeks the 6808T is expected to retail at between £600 and £700. The price will include a separate 300k 3 1/2in floppy disc drive. This compares with £1,700 you have to pay for the 512k Microtorch, which has a similar operating system that only allows a monochrome display, plus built-in disc drive and monitor. With the 6808T the monitor has to be purchased separately.

for modems and other serial devices and a Centronics parallel port suitable for dot matrix printers.

The ST can handle both floppy and hard disks. For floppies it has a built-in port compatible with the 800k Sandy 3 1/2in drive. There's also a high speed hard disc interface with a data transfer rate of 1.2 Mbytes per second.

Of course it wouldn't be an Atari without a joystick port, and the ST has two - one for the mouse which comes with the machine. With this complicated keyboard instructions are a thing of the past. Simply use it to pull down a menu and select the item you want. If you've never used a

Language

Choose between Basic, the language of millions, or Logo, the educator's choice. Both are built in.

Microprocessor

The Motorola 68000 running at 8MHz gives a combination of power and speed.

Cartridge

Slot for programs and easy ROM expansion.

Keyboard

A full typewriter keyboard PLUS cursor and editing section, numeric keypad and ten special function keys.

IF there is one single feature of the ST that has caused most headlines in the computer press - and created most controversy in the boardrooms of rival manufacturers - it is RAM.

The revolutionary, easy-to-use Graphics Environment Manager brings to the ST a new dimension in personal computing. What it is all about is described in the following pages.

mouse before, you'll be surprised at how much it simplifies your interaction with the machine. No more trying to remember whether it was Ctrl-K or Ctrl-G that did what you wanted to do. Just point and click, it's that simple.

Fast in the range to arrive in Britain will be the 6808T, which has 512k RAM. Both it and the 128k 1308T have 192k ROM expandable as the cartridge slot to a maximum of 320k.

With a list of features like these and a price well below comparable machines, it's no wonder the ST is causing such a lot of excitement!



Monitor + GEM

Choose between high-resolution RGB monitor, TV, or high-resolution monochrome monitor. See the GEM operating system in all its glory.

Expansion ports

RS232C serial port, Centronics parallel port, 3 1/2-in floppy disc port and hard disc interface port cater for every need.

Mouse + joystick

Two joystick ports, one configured for the mouse — the latest in user-friendly input devices.





New XE looks good – and it IS good!

FIRST of the new-look Atari machines to hit the British market is the 130XE. Like the previous generations of Atari – the 400/800, 1300XL and 640/800XL – it is based on the 68000 chip.

In actual fact, the new machines use the 68002, a more modern version of the chip which has a few extra commands and uses less power.

The 130XE is far more than just a good-looking version of the 600XL. For one thing it has a massive 128Kb of RAM – together with many other new features, product improvements and manufacturer's cost reductions.

All of which will help to make it a winner right from the start.

It has a great degree of flexibility in its screen display found in no other product line. It has 16-screen modes – 31 graphics and five text – plus/minus multiple graphics and four voice sound.

On the outside there's a slight new design. The keyboard has been improved and feels better than ever and the familiar function keys – Select, Option and so forth – are now positioned across the top of the keyboard.

If you're wondering about the cartridge slot – don't let it lead you to believe it has been forgotten. It has vanished from the top of the machine to the back. So you'll still be able to run all your familiar cartridge software.

Another major difference between

the 130XE and the 600XL is that the new machine doesn't have the parallel input/output (PIO) connector on the back. However it should hardly be missed – Atari didn't use it for anything!

There will be two other machines in the XE range – the 65XE and the 660XM.

The 65XE will have 64k RAM and the 660XM has a similar specification in everything except the sound.

You can think of the 660XM as being for Music, because instead of the standard four sound channels the 660XM has eight channels and 64 harmonics. The superb quality sound is achieved by using a sampling rate of over 30kHz.

You may have read elsewhere of a 6800P model. This was intended to be a portable version of the 68000 but will not now be produced. However for those of you on the move you may like to know that a 16 bit portable is promised instead.

One vital feature common to all in the XE series is compatibility with previous Atari machines – which means that the existing base of software, peripherals and applications will survive without growing obsolete.

MENTION the Atari ST range and the chances are that within the next few seconds someone will say "GEM". The acronym on everyone's lips looks set to become the operating system of a whole new generation of micros, and with good reason.

Digital Research, the company that gives us what is arguably the best user-friendly operating system in the form of CP/M, is now set to unleash its Graphics Environment Manager and show that the desktop can indeed change its spots.

So while we're looking at the ST let's look at GEM and what it will mean for Atari users.

In the days when CP/M was developed most programs had nothing more than text output. Consequently, it wasn't too difficult to capitalise on the 286 architecture and produce an operating system which could be implemented on practically any 286-based micro.

On the wings of this operating system such programs as Wordstar flew to fame. While it was undoubtedly a good program, it could never have achieved the eminence it did without CP/M.

Then came graphics. Suddenly the world was brighter for the user, but infinitely darker for the commercial programmer.

For while most machines incorporated primitives to print characters to the screen, the number of systems for handling graphics was almost equal to the number of brands of micros.

In crude terms, GEM is a graphics equivalent of CP/M but the time not tied to a particular chip. However in order to do justice to GEM we need to consider another historical event.

That is the one which stretches back from Apple's Macintosh to the research conducted by Xerox at Palo Alto. As Jack Terrell has pointed out, GEM doesn't copy Macintosh so much as draw on the "desktop metaphor" which came out of the Xerox research.

Whichever way you look at it the result is the WIMP philosophy – Windows, Icons, Mouse Programs. Because they share the same underlying ideas GEM screens and Macintosh screens have a definite similarity.

Of course the major difference is

It's a GEM of an operating system!



portability. The mistake which Apple seems to have made is in assuming that the user-friendliness is a function of the Macintosh whereas it is actually a function of the underlying philosophy.

While the Macintosh is a delightful "one-off", GEM has the advantage that programs can be easily ported between machines which support the operating system – and this time OS haven't tied it to a particular chip.

For while Apple's ST range is the most publicised supporter of GEM, the system will become available on other 68000/68010 based machines. In

fact, since it's largely written in C it could be implemented on any machine which supports a C compiler – which includes the Macintosh.

The advantages of a portable operating system might not be immediately apparent to the owner of a single micro. However when it comes to buying software the advantages become obvious.

Ian Turner, Ashton-Tate (UK)'s technical director, neatly summarises the advantage: "GEM offers an up-to-date, very user-friendly environment vital to the continued development of complex integrated packages

like dBase III and Paradox."

For Ashton-Tate, which is not committed to a sole machine or system, GEM's easy portability strongly supports our future development strategy.

That means that with GEM on the Atari ST you can look forward to a wealth of powerful software while enjoying the same of user-friendliness.

More than 70 UK software companies ordered the GEM Programmer's Toolkit on the first day it was available in the country. Hence the ST shouldn't need to rely on imported – and therefore prohibitively expensive – software, as has the Macintosh.

All in all, the value for money offered by the Atari ST range and the advantages of GEM in terms of user-friendliness and software availability look like producing a winning combination.

In the words of Sam Truwell: "We chose the GEM interface because it represents the most advanced microcomputer technology for learning to learn and use personal computers. It will help place Atari in a position to offer a powerful, easy-to-use personal computer at a low cost."

Unusually in the micro industry, this time the hype has an awful lot of truth in it.

All in operating system GEM does the heavy lifting between the user and the machine. However what makes GEM different is its extreme user-friendliness.

Traditional computer commands and keyboard entries have been replaced with easy-to-understand graphics images and an easy-to-use pointing device called a mouse.

Across the top of a GEM screen you'll see Menu Bars. Without ever touching the keyboard, you can use the mouse to pull down one of the menus and make a selection from it. It's as simple as that.

Operating your work is as much easier with GEM. By manipulating the screen display with the mouse you can collect a set of files into a folder, just as

you might in your traditional filing cabinet. You can even put folders within other folders.

The GEM desktop also gives you access to the sort of tools you'd normally have on your desk like a calculator – or even searching through the data drawers when all you want to do is do a quick calculation.

Spreadsheets and paperwork are also there, along with the usual other part of any office – the waste paper basket.

With GEM, moving information between files becomes much simpler. You can write the bulk of a report with your word processor, then cut and paste into it information from your spreadsheet and database files.

To help you make the most of your Atari.

**Why you should
give your Atari**

Disc Power!

Look what you get when you link your Atari to the versatile 1050 Disc Drive:

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It's simple! Despite its amazing capabilities, using the disc drive couldn't be simpler. It's easy to fit and even easier to operate!

With the 1050 comes DOS 3, Atari's latest disc operating system. Featuring a wide range of utilities, DOS 3 supports both single and dual density modes, so you'll be able to take advantage of the wealth of disc software that is now available.

And to get you going, we're offering £15 off this special clear starter pack!

The Play Off An exciting adventure game. Motivate you to explore the dangerous waters of Antarctica in New Jersey.

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Sound & Graphics Demonstrator See - and hear - your Atari in action. Programs that show the power of your Atari to help learn the incredible experience!



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Our price **£164** for UK Ataris

Save **£35!**



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What MicroLink can offer you:

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Let your Atari be your passport into the exciting world of telecomputing!

Minicade
modem
Software
Interface
ONLY £195
Save £200



Price includes VAT post & packing

IT'S the hottest growing field in micro computing. All over the world micros are talking to each other over the telephone line. As well as to the ever-increasing number of public and private databases bulletin boards - and even game machines compatible.

We want all Atari User readers to share in the new technology that makes all this possible. So we're offering a unique starter pack at an unbeatable price. It gives you everything you need to get in touch with the big wide world outside.

- Modem
- Software
- Serial Interface

The modem is the amazing Minicade Technology WS2000. One of the most powerful on the market, it provides all the facilities you require. Yet it's simplicity built to use. Just plug it into a standard British Telecom jack and you're away!

The package also features the superb Datalink serial interface, which links the modem directly to the Atari's peripheral port without the need for the 850 serial interface.

The best hardware deserves the best software to drive it, and with the comprehensive Multi-Modem programs the package is complete. It supports all the standard baud rates - 1200/75, 75/1200, 1200/1200 and 300/300 full duplex.

Your Atari User package will allow you to talk directly to other computers, to send your own telex messages, to get che shopping - even to download free software programs directly into your Atari.

You will be able to join Microsoft/Protext, which will immediately open up to you a vast mass of 750,000 pages of information - instant world news, sports, holidays, hotels, train and airline timetables, all regularly updated.

And you can become one of a growing number of enthusiasts who are joining MicroLink, the giant database set up in conjunction with Telecom Gold, which is described more fully elsewhere.

But first, send for the Minicade package - and enter the fascinating, limitless world of communications!

Atari User decided for Atari users . . .

In association with

TELECOM GOLD

CONJURE the enthusiasm of thousands of telecomm users with the maintenance power and versatility of Telecom Gold and the result is a vast, nationwide communications body that will open up an exciting new world for you to explore.

Go online to MicroLink and you're immediately connected to a rapidly-developing network of information and personal computing power. And all you need to become part of MicroLink is your Atari computer and an appropriate modem and software, such as the Minicade package described on this page.

Communicating the MicroLink way is not only fast - it's much cheaper than you might expect. For instance, even if you live outside the London 01-call area you can still get direct access to the Telecom Gold nationwide computer at local call rates.

You can use your electronic mailbox to send a whole-page letter for less than the cost of a first class stamp. And you can send the same message to 249 different destinations in the UK for no extra charge. (It would only cost you 50p extra to send 50 copies to your friends in Australia!)

And you don't need to be a computer genius to use MicroLink. You get instant access to dozens of centres with plain English commands, or by selecting what you require from a simple menu.

And the cost of using MicroLink? Just £3 a month. Plus small additional access charges which are fully detailed in our information pack. To obtain your copy, just tick the appropriate section of the coupon on Page 61.

* Telecom Gold is the trademark of British Telecommunications plc.

Experience the thrill of a REAL arcade game at home!



So excited have many video gamers you've played, you've almost seen anything like QIX. And no matter how many times you play QIX, you'll never play the same game twice because there are millions of possible patterns to play with.

This is the game every Atari user ought to have by his machine - so we're offering our readers £60 off the normal price.

£7.99

You don't just play QIX - you FEEL it!

Use the order form on Page 61

A message from
ENGLISH SOFTWARE™
to all owners of
ATARI, COMMODORE 64, BBC B,
ACORN ELECTRON and AMSTRAD Computers..

Software companies grow on taxes—at least that's the way it's scored from the number of new companies springing up every year.

ENGLISH SOFTWARE was launched three years ago with a smashing hit game for Atari Computers called **AIR-STRIDE II**, which quickly became one of the most popular U.S. programmed games for the Atari.

Then, as now, Atari Computers were amongst the most advanced on the planet, but they were a **TRIPLE expensive!** But we knew this price would come down, and that more people would soon appreciate the great range of Atari software produced by **EMULON SOFTWARE**. But Atari owners **used** to be a funny lot, long-haired, bearded, with a certain...

"I can live anywhere. It costs less than a 20th floor. That's what they used to say! Anyways, in the face of this rather strange attitude, we were about to compromise the ultimate one."

6780-6795

We expected some slight resistance to these prices from Africans who only requested high quality with high prices, but we were wrong. Everybody thought the prices were great. **and** everyone

He even produced the fantastic **AMBI CASSETTE** **STANDARD** of 17 95, a superb utility program for **IBM** computers.

So now, for those of you who might have missed out on all our content from this, we are releasing something very, very special.

ATARI SMASH HITS Volumes 1, 2 and 3
From: B&B INC SOFTWARE

Five-year game-on-one contract for only £14.95
or only \$8.17 (US)

Each cassette features our top rated **JET-BOOST™** and five other popular titles. So now you have to secure the right out-of-the-box range of 100% produced Ken 400/500/600/800/9000 software for 50th machines. If your dealer does not yet have them in stock, ask him to order them from his nearest **RAIWHOLESALE™**. It will be the best deal he or **RAI** can make for you!

We have also just released **CDL055US CHESS 3.0**, the best chess program available anywhere for use on a 386/486/586 IBM PC compatible computer with 80486. Very powerful, with lots of excellent features.

For our good friends with either home computers, our programmers are busy producing original games for you to enjoy. They are all listed on this page: **ADAM'S HOUSE** on the Commodore 64 and **JET BOAT** and **On the Edge** on the Spectrum are now available at a reduced price to our members.

Selected English Software Titles are available in HANGKONG and selected branches of LASHY, SCOTS, GRANADA COMPUTER, MOROS, CO-OP STORES, THE 3LUA SHOP, The Order and Revisited, and selected SOLOSTORES.

THE EUROISH SOFTWARE COMPANY
1, North Parade, Parsonage Gardens, Manchester M60 1BR
TRADE ENQUIRIES WELCOME: 061-835 1358



New deal on prices promised

A NEW deal for Atari users world-wide has been judged by Jack Tramiel, the American entrepreneur who recently took control of theiling corporation.

The man who turned Commodore International into a billion dollar success story has now promised he will achieve the same for Atari.

And, along the way, he has promised announcing price benefits for the 25 million users of the corporation's products.

I place the money where my

mouth is," he insists.

"Since I acquired the Atari Corporation prices of our computers have been nearly halved. And that is entirely at a short-term level."

"We're in the business of people's technology. And as Henry Ford said before me, 'for everyday use comes from the well'—priced at a whole new dimension of buyers are entitled."

I believe it and that's how the business is going to be both new and old."

The reason for giving a public

understanding to his customers is that Jack Tramiel is unhappy about what has been going on in the personal computer marketplace.

"Too many people have gotten out of the business," he warns. "But the consumer is catching on."

Warning

And he also took time out to issue a warning to his would-be competitors here in the UK that Big Jack Tramiel has their eyes on them.

"There are one or two people who think they can outdo or out-produce me," he says. "Well let me tell you that just one of my worldwide plants ships out more than the next top three UK companies put together."

"Technology is what the decade is about," he adds. "I've given the technology business out in the Far East. They're going to produce it at the price the man next door can afford."



Message from Atari's European general manager

Big sales ahead

ATARI's newly-appointed European general manager, Italian Massimo Ragni, has forecast spectacular results for his "people" during 1986.

"Next year the European market is going to be bigger than the States", he claims. "It should top around six million units."

SOFTWARE ON THE WAY

AN impressive list of software houses is working on products for the ST range, according to reports from the UK.

Heading the list is Microsoft which is said to be licensing its range of Macintosh software to take advantage of the ST's superior colour display.

Several of the country's top game companies have taken to the ST — among them renowned producer of flight simulators Sublogic leading education software house Spinward graphics specialist Penguin Software and Microprose whose games have been brought to Britain by US Gold.

DRIVE FOR EFFICIENCY

ON the day he started out in business more than 25 years ago, Jack Tramiel devised his own work ethic. And he has followed it religiously every day since. It is this:

"We've made for doing things the way they were done in the past, always

And new ways to do things better, more efficiently. Our customers are mature and intelligent people, we must give them the kind of clear, hard, earned money because, if we don't, they will know we have cheated them."

All aboard the Atari bandwagon

MANY leading high street retail chains are lining up to board the Atari bandwagon once the ST range starts rolling off the production line this autumn.

Among the big names likely to be stocking the new Atari line are W.H. Smith, Boots, Currys and Lloyds.

All four have expressed interest in, or have been engaged in negotiations about the Atari ST range.

John Spivack, computer merchandising controller at W.H. Smith, was very enthusiastic about the Atari's chances when interviewed recently on TV.

He said he would be selling

the ST range in his retail outlets first — then if it proves itself and lives up to its promise I think we'll put it into our business centres as well.

A Lloyds spokesman said it seems very likely that we'll be stocking the new computers but that we are a bit tilted as we already sell more Amiga than Spectrums.

The Amiga 8088, has done extremely well and we expect the same from the new products, judging by their specifications.

Boots confirmed it was discussing the possibility of

stocking the new range with Asda and Currys's merchandising operations director Simon Williams said: "The product looks extremely interesting."

We are hopeful about stocking it and at the moment are in the process of finalising our negotiations with Atari.

Meanwhile Asda chief Jack Tramiel maintains his company will have captured a quarter of the British home computer market by the end of the year if not sooner.

He predicts sales of 200,000 Atari ST computers here in the next 12 months.

Atari Logo nominated for top award

GRAPHICS language program Atari Logo has been nominated for the British Microcomputing Awards 1986 in two major categories.

It has been shortlisted for both the Home Software class and Thomas Television's Database Home Software of the Year award.

Recognised as the Oscars of the computer industry, the British Microcomputing Awards this year attracted more than 1,000 entries.

Organised by Personal Computer World, The Sunday Times and Thomas Television, the awards seek to define technological excellence and value

for money for the consumer.

All the shortlisted products are to go before a panel of judges who will then select the top three finalists in each category and ultimately the outright winner.

Judges for this year's awards include Robin Bradbeer, David Bebbelton, director NCC, Dr Brian Page, president BCS, Janet Rutledge, MCC, John Turnball, NCC, Philip Vega, manager MCC Microsystems Centre, and Ian Whitlow, president, Computing Services.

Awards ceremony

The winners will be announced at a ceremony hosted by Sir Alexander Burnet at the Park Lane Hotel, London, in June.

At that time each finalist will receive a framed certificate with specially designed award trophies for the contract winners.

The proceeds of a concert to be given to commemorate the ceremony are to go to the Computer Museum in Education and Training charity.

Atari - good moos for cows

ATARI technology is helping British dairy farmers manage their herds more efficiently.

The B3000 is at the heart of a computerised milking husbandry system designed by milk yield monitoring and feeding technology experts Humby Electronics.

The £1488 Humby Baby system - which includes computer, printer and software - is for dairymen with small herds of 20 or more cows who can't afford more expensive technology.

Humby says it provides 95 per cent of the benefits of larger computerised dairy management packages and should pay for itself inside two years.

Efficient

The system linked to electronic operated farmyard milking and transfer each cow, enabling the farmer to get the most efficient feed supply for his animals individually. It provides herd summaries showing cow performance, feed requirements and margin over concentrate, individual cow records and action list for day-to-day herd management.

Humby managing director Hugh James told *Atari User*: "We chose the B3000, because we wanted it to be as easy as a high level of programming language and a variety of software."

In other words, the farmer is able to also run B3000 software like accounts and word processing from sources other than computers.

An additional bonus with the Atari is that while the farmer can use the system to manage the dairy herd more efficiently, the computer is also a family entertainment centre in which his kids can play games when it isn't being used to monitor the herd.

Now link up with Prestel

OVER 300,000 pages on Prestel have at last been fully opened up for Atari access by modem manufacturer Minerva Technology.

The new Multi-Viewterm/Database modem interface and software package makes all Prestel facilities available to Atari users who previously have had to make do with the limited access afforded by the BMD interface. Now the older inter-

face - notorious because of its inability to handle split-based rates - is no longer necessary.

The package allows load rates of 1200/75, 75/1200, 300/300 and 1200/1200 and includes both Atari 13-way peripheral port plug and standard 25-way plug to fit the world standard modem. Minerva themselves, as well as many other modems, The Datamax interface and

Multi-Viewterm also-based software also give the Atari owner access to other previously inaccessible Viewdata systems, electronic mail, sales, databases and user-user communications, plus teleconferencing.

The package can be used with Atari models 400, 800, 1000XL, 1300XL, 1500XL, 1600XL and 1300XL and costs £55.95.

Does your micro go bump in the night?

It seems that Atari computers - along with ghosts and ghouls - may be among the things that go bump in the night.

A scientific body which routinely investigates strange phenomena ranging from the Loch Ness monster to UFOs has turned its attention to the machines.

Roger Morgan of the Association for the Scientific Study of Anomalous Phenomena (ASSAP) has written to Atari after for help with his research.

Can I appeal to readers for any information - at first or second hand - no matter how bizarre - concerning unexplained noise, malfunction or unexpected

output? The info.

Contrasted at his London home, he explained, he was looking for things like strange messages suddenly appearing on screens.

ASSAP founded three years ago, has some 300 members across the country who devote much of their spare time to serious investigation of the paranormal and related fields.

It was recently called in to investigate reports of hauntings at Marylebone magistrates court and has developed an infra red video recorder to assist in its work.

Why has ASSAP suddenly become interested in com-

puters?

We feel they are a valid subject in the light of the fact we have collected some very interesting data from things such as allegedly 'sensitive' Roger Morgan.

Magpies

Secretary of ASSAP is Dr Hugh Pimott who also believes computers may well act as vehicles for psychic phenomena.

A particular interest of mine is regressive hypnosis where people reveal what apparently happened to them in past lives.

Now one of the areas under investigation is the possibility of a computer being a spiritual computer in the sky.

ST range on schedule

AT&T has successfully dismissed the Court's claim that its ST range may never reach the marketplace in a recent interview. He Ginn said, "I'd bet you \$100,000 I'd bet not a chance. I don't think it will come off at all."

But Atari UN product manager Jon Doherty cautioned: "There is a great need to

With all these good stories and the Boston Herald's new place...

There is no foundation for the Silver comments whatsoever. The product will be available here late June or early July as we have said all along.

Greene also scoffed at the claim a comment that the ST "doesn't have any soft-spots." He scoffed that "it's

Even Jack Thorpe told us long ago in January that "by May we will have 20 to 30 RT software packages ranging from graphics to entertainment." That still holds.

And Dean added that one for 60 of the \$4,500 development machines have been supplied to US software houses and would soon be available to the UK.

Chat show goes live on Prestel

MICROMET has launched a major innovation in chimney venters — the first true pre-painted on Pental to be scheduled on a regular weekly basis.

Category Challenge game rings games that test children's ability to interview and interpret personality traits from their home computers over the Internet screen.

The service is a development of the highly successful Late Night Chatline which is second only to Mashed! itself in the Period Tag Top all time popularity among women!

Celebrity Children is similar to Late Night: Children. It airs on screen that facility except that Margaret adds David Babity treats to the horses of selected celebrities.

As Microsoft members who frequently attend sponsored or special events during the night's celebratory repast on the rooftop lobby will not have to wait for a table.

One of the first guests on *Colony Obscure* was David Meakin, managing editor of *Atlas Obscura*, who commented, "It was gratifying for David to be chosen to help launch this exciting new development."

This is yet another example of the pioneering spirit behind the National Operators and helps to explain why more users are joining an ever-increasing number.

Celebrity Chatfest is at
Margaritaville every Wednesday
between 7 and 8pm.

Minding the store

AI/ML computers play a central role in the day-to-day operations of managing retail stores across Indian businesses.

As HENL, we have different stock quantities on hand at the time a low bid is received, depending

And another sign: on the 10th there were 10 wind-whirls down at the bottom of the lake.

Software for the system will be designed by Keith Williams, stock controller at the Manufacturing Research

He told *Adweek*: "Although it's written in plain old BASIC, the software runs fast enough for our needs and has been a big hit in terms of efficiency."

All the items in stock carry a code and every Friday we attach the stickers to our retail set on the sign. A list of what we need for the following week is compiled and sent via our Email and orders to our members or Neighbors.

The PDP computer at headquarters also handles orders placed directly by clients who own 300/300 baud modems and use our CAPI facility.



Pack hits jackpot

Learning of C-118 on the individual
level

Also, UK marketing manager Rob Harding commented: "We believe that the first time consumers no longer satisfied with anything less than a 64K machine. They also require a package that can be used immediately - like our starter cards."

A major Almad objective this year is to increase clay pipe penetration of the market because of their superior performance.

THE Alan starter pack which offers £200 worth of value for only £129.99 is another great value.

The pack includes an 80386 54k computer with a 10 to program recorder and cassette versions of *Imitation 1*, *Programing*, *Fake Position* and a *revelation* disk.

Recognizing that many customers want to use the greater flexibility and quantity of disc drives compared with tapes—but at prices they can afford—Adap also combined an 8000 with the 1050 disc drive as two discs containing Home File Manager along with The Pay off game and graphics software.

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 10

Rotterdam HQ for European operation

A MAJOR reorganisation of Asia Corporation was undertaken before the European launch of the new range of personal computers.

This has included controlling most of all European markets for distribution and administration. However, in Romania,

Atari Corporation chief Jack Tramiel announced: "From now

on waters feeding the European market in exactly the same manner as we treat the United States. — That is an old single market.

¹⁰We believe the market will be dominated by multi-national companies satisfying world-wide economies of scale and with access to world-wide resources. Our alternative will

reflect that objective with the most realistic efficient and cost effective central distribution and transportation system capable of handling volume sales.

Simon Westbrook, UK managing director, said: "All the other European operations of Atel have now adopted this pattern, with the UK being the

[illegible]

The requirements of our busy customers in terms of deliveries will be met through computerized call-off production linking factory production with the Rotterdam warehouse.

In this way inventory control will be extremely tight and will slash inventory carrying and therefore total costs.

the
one,
the
up
the

You score a point for every hit and you will be awarded a total of 10 balls. Information about the number of balls played and hits scored is displayed on the screen continuously.

This program is a fairly straightforward application of the Axiom user-defined graphics. Only two new characters are defined — the solid block for the start value and the round ball shape — so you should be able to follow the details quite easily.

Another feature to note is the way the sound is used to evoke the location of the ball more than its direction.

Use If you want to see the effect of leaving the record out change the FROM to NOT IN (1)



SUBROUTINES

SUBROUTINES

10	Save up variables and graphics character
100	Set up court and balls
200	Main play loop
450	Draws court
450	Round routine
730	Moves ball up screen
800	End of game - prints final score and offers another game
1010	Subroutine to move ball
1300	Moves left of ball
1350	Moves right of ball
1600	Defines graphics character for solid block
1600	Defines graphics character for ball
1700	Change to RALD character set
2000	Sound routine for Paj
2800	Sound routine for moo

[illegible][illegible][illegible]

*Programming is easier
than you think – and
doubly so if you follow
MIKE BIBBY's crystal
clear guide through
the micro jungle*

I DON'T know who you are. You might be a wife whose Atari owning husband is away at work, or a father who is trying to come to terms with his daughter's Christmas present. Alternatively you might be a techie who has just been "computerised".

Whoever you are, the fact that you are reading this article tells me your guilty secret: You want to be able to program the Atari mine.

But how to begin? You must have noticed that some people take to computing like ducks to water, or an output port to an interface, so they won't say.

Words like beta, strings and user-defined functions flow freely from their lips. They pass parameters and handle interrupts with ease, then get their hands on the peak and poke in a way that beggars belief!

You I take it, are not like that! You are not a computer "natural". But you would dearly like to be. Well fear not! This series is for you and it was written by one of your kind.

I too have sat at a keyboard watching the cursor without having any idea of what to do next (or even knowing it was called a cursor).

I also know what it's like to have someone explain something to me in the simplest possible terms, and still find it way above my head. Yet I now programme reasonably well... and so can you. Read on!

Let's assume for a start that you are seated in front of the computer which is already plugged in, connected to the TV and tuned in correctly.

Some versions of the earlier Atari

will need a Basic cartridge plugging into the left cartridge slot. If your Atari is of the sort, make sure the cartridge is in. And that is the end of our assumptions.

The On switch is a rocker switch at the rear of the computer on the left. Push over and switch on (and the TV if necessary). You'll hear some buzzing from the speaker of your TV and then the message READY will appear together with a rectangular block the cursor.



If you're lucky enough to have a disc drive attached, keep it switched off for the moment – you won't need it.

The READY message is called the prompt. This indicates that the micro

is ready for you to type in some information. Try typing in two or three letters – just part of the alphabet for the moment please.

You should soon see that the cursor indicates the position at which the next letter will be printed on the screen.

Before we type any more, let's examine the keyboard. Fundamentally it is a standard typewriter keyboard surrounded by several additional keys. Notice that the computer has a @ (at) key and another key for the letter O.

You must keep the two separate @ for numbers, O for words. I guarantee that a lot of your early errors in programs will be from mistaking I as l and vice versa!

On the same line, notice that there is a I (and) key. Make sure you do not use I (incidentally a lot of your other early errors in your computing career will be from mistaking I as l and vice versa).

Other keys are labeled by words such as Shift, Esc and Return. Let's

introduce a convention to make life easier. If I want you to press the key labelled Return, for instance, I will ask you to press:

[Return]

If I ask you to type RETURN you have to type R then I then E then T and so on. The symbols [] enclosing a word indicate that you are to press one key with that word on it. You do not spell it out.

Now Return is quite an important key. We use it in a similar manner to the return key on an electric typewriter, to ensure that the typing continues on a new line. It is far more important than this, though. Return not only gives you a new line but also sends the message typed into the computer to be acted upon.

If you have been following so far you should have typed a few letters on your screen so that it looks something like:



If not, type a few letters now. Next, press [Return]. Quite soon you'll get a message back from the computer saying:



Don't worry about the ERROR message. You can't hurt the computer by accidentally retyping something, so feel free to experiment.

At this ERROR message is that the computer doesn't understand the words you've just sent it. You are, it needs to be spoken to in its own language, which is called Basic.

However learning Basic isn't like learning a genuinely foreign language. Basic is very similar to English but it only allows selected English words — called keywords — to make things simpler for the computer.

This, by the way, is the reason I

As far as the computer is concerned "end" and "END" are different words ...

and that if you code on you would get ERROR returned from the computer.

You might be curious: have I not on a Basic word. For example, in Basic you can mark the end of a program with END. The people who designed Basic would have chosen the word FINISH to do this. Type:

END

and press [Return]. Then try:

FINISH

and press [Return]. Note the difference:



Amazingly, END doesn't accomplish very much — after all you haven't anything in there to end, have you? — but at least, the computer doesn't list the message ERROR at you as it did with FINISH. This is because END is a Basic word, while FINISH isn't.

So far your typing should have been appearing in upper case, that is capitals only. Let's investigate.

If you look at the lower right-hand corner of the keyboard you will see the keys Caps and Shift. All the letters of the alphabet that you type will appear in capitals, unlike a typewriter which prints in lower case unless you hold down the shift key.

In this state, which we call Caps Locked, pressing a key with two characters marked on it will cause the lower character to appear on the screen. To obtain the upper character press the key while at the same time

holding Shift down. For example pressing:



will give you A on the screen while pressing:



and [Shift] will give you a on the screen.

Now I introduce a convention. If I want you to press two keys at the same time, I join these keys with +. To enable the keyboard to function as a normal typewriter press [Caps]. If you type now you will find that the alphabet appears in lower case unless you press [Shift] down with it, when it will appear as capitals. Remember, if you want to get onto a new line, just press Return and ignore any resulting ERROR message.

If you press [Caps] once more you'll be back to the situation when you switched on, with the alphabet appearing in upper case whether you press [Shift] or not.

Press [Caps] once more and the letters will once more appear in lower case until shifted, and so on.

At the moment the keyboard should be acting like a typewriter — giving upper and lower case. If not, press [Caps] once more.

Get onto a new line by pressing [Return] and type:

and [Return]

You should get ERROR, which proves that as far as the computer is concerned, and and END are

different words. It recognizes "END" as the Basic keyword but not "and". This is the reason for the Caps key. If you have this on, you automatically type in letters of the alphabet in capitals, so preventing you from mistakenly entering "and" instead of "END". For the present I am going to assume that all your typing is done with Caps on. If it is not on at the moment (which it won't be if you have been following) just press that key once to rectify the situation.

You've probably noticed that holding a key down for more than a fraction of a second causes that letter to repeatedly type itself out on the screen. If you haven't try it now. This behaviour is known as the auto-repeat.

By now you will have probably filled up a screenful of text and seen the scrolling action demonstrated. If not, press (Return) several times in succession or more sophisticatedly hold (Return) down and let the auto-repeat do the work for you. As

you'll soon see, scrolling is when the top of the screen rolls up to allow more typing at the bottom.

You could if you wanted clear the screen like this by keeping (Return) down until everything scrolls off the screen.

An easier way to do this is to press the (Shift) key together with the key marked (Clear) which you'll find in the top row of keys on the right. Try it.

You can achieve the same effect by using the (Control) key instead of (Shift). So (Control) + (Clear) will also clear the screen off too.

(Control) is quite an important key. Just as we can combine shift and the alphabet keys to alter what we get in the screen (capsals instead of lower case) so we can combine (Control) and other keys to gain special effects.

Try (Control) + 2. The mouse should jump at you. We'll look at other uses of Control later.

To conclude this preliminary examination of the keyboard I

suggest that you clear the screen if necessary, then type in a few letters (without pressing (Return)). Now press (Delete) once. The last letter you typed should disappear, its position being taken by the cursor.

If you keep (Delete) down the auto-repeat will function and erase your whole line. You can use this to correct typing errors. Simply erase back to the mistake and retype.

This is just one form of what is called screen editing. There are other ways involving the =, +, - and (Insert) keys but these can wait a while.

Right, it's a computer so let's get it to compute. But don't worry this isn't going to turn into a mathematical treatise. After a brief but necessary foray into simple sums this article is thoroughly non-mathematical.

Before we start, let me give you a warning. The computer will do exactly as you tell it but only when you tell it. It's a very literal machine and in this respect is like my daughter. Oh, a

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mathematical one.

When asked to put on her pygamas for bed she did exactly as she was told. Of course, I realize I asked her to take her other clothes off first. Had I? You can imagine the results.

Similar things happen with the computer. Say we want the computer to calculate $2+3$. Not only do we want it to do the sum but we want it to tell us the answer when it's done it.

We instruct the Atari to write things on the screen with the Basic word PRINT. This is a relic from the days when the computer's output, as so-called, was actually printed out on paper rather than on the screen as it is now.

So to see the answer to $2+3$ type

PRINT 2+3 (Return)

Now that you don't need the = sign as you do on a calculator (Return) takes care of that. Before continuing try a few simple additions.

Just as the computer does not allow you to use Q for Q, it also does not permit you to use a for multiply. The computer uses the symbol * instead. For example try

PRINT 4*3 (Return)

Minus (-) is straightforward. You'll find it sharing a key with an underline character and a vertical arrow. Divide, however, is not - but an oblique - stroke (/).

For example $12 \div 4$ becomes

PRINT 12/4 (Return)

Though this may seem at first a little odd to you, you have met it when dealing with fractions. $3 \div 4$ is equivalent to the fraction $3/4$.

Try

PRINT 3/4 (Return)

From now on I am going to assume that you accept that before the macro can act on your instructions they must be sent to it by (Return). I use therefore ones (Return) from my examples. Make sure that you don't.

Before experimenting with further sums of your own devising I'd like you to try the following sequence

**PRINT 2+3-3
PRINT 4*5/2
PRINT 4*5+3
PRINT 4*5*2**

If you think carefully about the results you'll see that the computer

interprets sequences of sums in the order you learned at school. You do whatever is inside brackets first then multiplication and division then finally addition and subtraction.

Now try

**PRINT 2/3
PRINT 10000*10000*10000
PRINT 1/1000**

If you have done this correctly your screen should display

```

      2 + 3 = 5
      4 * 5 = 20
      4 * 5 + 3 = 23
      4 * 5 * 2 = 40
  
```

The point to stress here is that the computer works to a limit of accuracy. For example $2/3$ is not exactly 0.6666666666. The error is well under a millionth though. Still, it must be borne in mind.

Similarly with especially large or small numbers the computer saves space by storing them using a scientific notation called exponential format. Here for example instead of printing out the answer to $100000*100000*100000$ it is 100000000000000 it prints out the result as $1E+13$.

For E which stands for exponent you should read "multiplied by 10 to the power of". For example $1E+12$ means "1 multiplied by 10 to the power of 12" which if your maths is up to it gives you the correct answer.

Similarly the answer for $1/1000$ was returned as 1.0E-03 which reads as "1 multiplied by 10 to the power of -3" which is 0.001 the correct answer.

If you don't follow all of this, don't worry! I've only provided it so you can about odd looking results to your sums which might pop up and confuse you.

Now let's try to get the computer to print out some words. Let's get it to print out Hello. If you can't you'll find back to your textbooks (and for some of us that's an awful long throw) you'll remember that when someone says something you surround what that person says with quotation marks (or quotes for short) such as He said "Hello".

In Basic, of course, we don't use

words we PRINT them, but we do surround them by quotes. We omit however the comma and full stop. Try

PRINT "Hello" (Return)

and the computer should print out Hello.

Notice that the quotes are not printed. So to get the Atari Basic to print out a message on its screen we just use PRINT followed by the message surrounded by quotes.

The message inside the quotes is called a string - since the macro considers it to be just a string of letters - or a string literal. The latter is because the computer prints out literally or exactly what is between the quotes.

So

**PRINT "Hello"
PRINT " Hello"
PRINT " Hello"**

gave different outputs since in each different number of spaces precede the Hello.

Actually strings do not have to be words. They can be any combination of symbols, including numbers. Just keep them in quotes.

Try the following

**PRINT "4*3"
PRINT 4*3**

This should convince you that the computer does print out strings - that is what is between the quotes - literally. When the calculation is in quotes the computer simply echoes the sum on the screen. When the calculation is not in quotes, the computer prints out the answer.

Experiment with printing out various messages on the screen. How long can you make them? Try fewer than words as well.

As the remarks the computer is responding to our comments as seen as we send them by pressing (Return) but in a calculation or task requiring several steps this can be rather tedious.

It would be more satisfactory to give the computer a whole sequence of instructions that it could get on with rather than spend half a day by step.

This is possible.

Such a sequence of instructions is called a program and next month we will begin writing some.

Dare YOU

All adventure is a fantasy world which you, the hero, have to explore, often with the object of finding treasure or meeting someone, and generally being a hero.

Does that? Not at all.

The crafty programmer who's written the game hasn't want you to run for cover. So he makes it as hard as possible, with a few very hard tests.

Believe me, when you've spent an hour trying to find a key to open a mysterious locked door only to find that the key is locked from the other side, you'll be ready to struggle that programmer.

All adventures are like a detective novel, full of clues, puzzles and red herrings. Your job is to solve them, solve the puzzles and, hopefully, recognize the red herrings.

What's more, because you're in a fantasy world, with its own special laws, you can also have jet flies, magic or even aliens to help with.

So if you find more often at night?

So where do these adventure games come from?

They came from England in the 1940s and went flying all over that way of America in the mid-1970s. Two mainframes

(mainframes, Craymer and W. Cole, were in a program called) G. I. and G. I., which consisted of 1,000 games, for half more complex than the solving and the in fighting monsters.

Then quickly followed with other strong other programs, and might have to mention in maintenance but for an interesting man called Scott Adams.

He adapted one of these massive programs to a file THE-22, published it, and the first adventure for a home micro, Adventureland, was released.

Since then more adventures have been written. They came with very few basic types—role-playing and text.

Role-playing games tend to simulate a D. & D. game very closely, so that you choose the type of role you wish to play, such as warrior, thief, sorcerer, wizard and so on.

In the form of your choice, your own unique strengths and weaknesses which you expect to follow the objectives and in the adventure, the "collecting treasure."

Each day treasure is also in, usually in the possession of some monster or other you spend most of your time fight-



go Adventuring?

By
BRILLIG

ing them. The result is that you progress often seems to depend more on luck than skill.

A good example of this type is the highly acclaimed Liffware series — I, if not all, are always available, with 16 characters "real soon now".

Test adventures are themselves because they originally consisted of text only, and were based on the same type of format as the original Greater and World games.

The latest award, apart from the first Adams series, have to be the Dark Village. However, it's good to note an English adventure house, Level 3 Computing, with a well-known reputation in this field. Their version of Old and Adventure gives the original game with a few extras.

Some adventures are described as "graphic adventures" or "MUDs a la fantasia". These are basically text adventures with pictures and the format is pretty much the same as for text adventures, but with only three or four lines of text each. Obviously, the picture replaces much of the description of the location.

There was a time when you had to have a computer to play text adventures, not at the expense, incidentally, of re-

view, the success of Infocom and Level 3 shows that text adventures have staying power. As long as there are plays on the radio, there'll be a place for your text adventures — the best places are the ones in your imagination!

With adventures, you either love them or hate them, and it's very hard to drag away the a few more fantastic from his attention long enough to talk about them.

You must have seen one of these adventure freaks. They're the ones who come to the computer club bleary-eyed from playing their latest game until three in the morning.

Yes, I know you thought he was a narcissist, but now we know.

What's so special about these adventure games?

I guess you are also rather of the object of them, so let's give you an example from that first Dark Village game.

The aim is to collect and store 12 treasures. To get one of them you have to walk a sleeping dragon with some help.

The boss has to be caught in an empty bottle — after you have first covered yourself in mud to stop them stinging you.

The bottle is full at first and





has to be emptied over some hole to get another treasure.

However, now you get to the location where you expect the bottle you need a rag and a ragged sword to get into.

To get the rag you need to rub the lamp on an other treasure.

Now very short, you have to climb down a hole to get the treasure to light the lamp, which you find by chopping down a tree, after you've first climbed it to get the key which opens the door.

Where? In the head? No! It's!

But that's where the attraction lies, in solving the puzzle, progressing through the adventures and getting that final treasure in the end.

CONTRIBUTOR: MR. ED
A BOSTON ADVENTURER

I know it must sound very complicated. But adventures are really logical. Adventure that I go to is a real one, very unusual, but all the puzzles can be solved.

And there is no greater feeling than to solve a problem that has been stumping you for hours.

Now I'd like you interested in them and you're all going to walk out and buy up the stock, so we glad you the best news.

ALL adventures are very hard for Ask beginners.

The great secret is that they are just like everything else. The more you do them, the better you get.

I can remember my first game, and I can assure you it was not a very complicated beginning.

However there are certain things common to most adventures. I will explain how to solve with them so that your first game won't be quite as traumatic as mine.

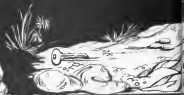
First, if not all, adventures have a secret in them, some action. Often there must be logical, so if you go through and then search you end up in the treasure you started from.

There are not so logical, but the answer for them is the same - make a map.

If you cannot do, again you is better to know the object of the game, your destination is the direction of the walk, the drop a one of your own plans and make a map based on them.

Some adventures have more than 200 locations, so it is a good idea to make a map of your travels anyway.

Another thing common to most adventures is solving a



in the dark, often unimagined or in well-known. Obviously you need to get a lamp in touch or at least some matches.

Should you make sure you have a match always close by so you can light it first. Or you need matches or lanterns - or all if it's an old lamp?

If you do end up in **PITCH DARKNESS**, try and reverse the move you need just made. If that proves fatal, try and find the lamp and the means of lighting. If failure, you must find location.

If you've got the lamp, try **SHORT LAMP** or **LO** or anything else you can think of before using.

A few other things that might help, you which should be obvious are **FO**, **CH**, with sticks, stones and rocks.

If you find a shovel it's a good bet that you will have to use something, either to find a treasure or to get an object that will help you a considerable bit in the adventure.

Examine your surroundings. If you are in a forest, can you climb a tree? Or if you've got an axe, can you chop that tree down? Can you climb a wall or a fence?

If you find a rope it's likely to be tied to something

where to climb something or perhaps to pull something.

An object that is too heavy to throw might be able to use **THE ROPE** and **PULL** the object.

There are a few general tips that are applicable to all adventures.

If the program allows you to save the game - that is, allows you to return to the location you have reached should something you do prove fatal - then use it before you enter any trap, enter a place, or before trying anything dangerous.

If something doesn't work, such as taking a treasure made in the road by saying **TAKE BUCKET**, then try doing it a couple of times.

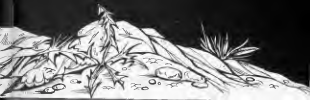
These programs are a crafty bunch, and sometimes make you do a thing a few times before you succeed.

Always read the game descriptions very carefully. Sometimes clues are hidden here. Always **EXAMINE** everything.

Always you must have an idea of what you're doing to all effect.

You never know, maybe we'll be seeing you staggering into the computer club with heavy eyes sometime.

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If you have toddlers who are just starting to spell, the delight they show when you run this program will amply repay the effort of keeping it in.

The idea is that you use a crane to pick up letters being dumped by the Alphabet Train in order to spell the word displayed at the bottom of the screen.

Because the word is on-screen the whole time, even children who are not yet ready for spelling can gain important practice at shape matching.

Only a portion of the train shows at any one time, but the letters are arranged in alphabetical order. Moving the joystick from side to side or pressing either of the cursor arrow keys — the ← or → without using Shift or Control — moves the train across the screen.

Press the joystick button or the Space bar and the crane lifts up the

Learning to spell can be fun when you load up the..

letter which it then deposits on a waiting dumper truck. It is possible to pick up an incorrect letter, but the efficient workers won't let it drop on to the truck.

Once the word has been built up, the truck rolls off to the word factory to be decommissioned or a merry tune.

Alphabet Train was written by Stan Dekkers who contributed it to the Oregon ACE public domain library. We've made a couple of changes to the original, including the facility to use the keyboard instead of the joystick.

The words are held in the DATA statements of the subroutine which

starts at line 1000 so it's not too difficult for you to include your own words of special significance to your children.

If you replace any of ours or add your own, make sure the number after the RANDOM* in line 1010 covers periods with the total number of words in the data statements. If the number is smaller than the number of words the words on the end of the list will never get chosen.

More importantly if the number is bigger than the number of words, the program may finish with an ERROR 6 — otherwise known as OUT OF DATA.

Also don't include a word which has any letters repeated because the Alphabet Train only has one of each.

Alphabet Train has already become a firm favourite with our toddlers. If they play with it for much longer they'll never get the next issue of Ace User off to the post!

PROGRAM STRUCTURE

142-146	Title screen
159-232	Dimension strings and read DATA for various characters
280-330	Initialize player, initialize PPU
340-390	Map appearance alphabet letters A-Z into PPU and
400-470	Map SCRS onto screen
480	Move truck in from right
500-590	Prints random word
600-690	Main loop to control train and manipulate alphabet
700-790	Test for truck or keypress then set direction of train
800-870	Move train left or right; test for fire or space bar
880-910	Push up selected letter
920-980	Push up incorrect
990-1040	Word correct, engine truck out
1050-1100	Put correct letters back
1110-1140	Test for words

SUBROUTINES

810	Moves the character out
820	Picks a random word
830	Prints truck
840	Plays tune

MAJOR VARIABLES

WORD	Random word from 100
DIR	Relative change in direction of train
PM	Player results page address
K	Keyboard status
S	Joystick status
SCR	Upper left corner screen address
TRN10	Contains train's graphics
TRN20	
TRN30	
TRN10	Contains truck's graphics
TRN20	
TRN30	
VVTP	Points to variable value table
X	X location of train
XP	X position of PM3
XR	X position of PM3
OFFS	
H1	General memory address
LO	



Age Group	Percentage
18-24	22%
25-34	28%
35-44	18%
45-54	15%
55-64	12%
65-74	8%
75-84	5%
85+	2%

Early Learning

[illegible][illegible][illegible]

THEORY

Further savings effort on Page 61

Get in the right Mode for screen displays

First in DAVE RUSSELL's series on graphics modes

IF this series we'll be looking at the Atari's various graphics modes and seeing what each is capable of displaying.

You may have met some of this information before, or you may have discovered some of it by accident. If you think you've found something that nobody else knows, write and share it with your fellow readers.

If we're going to look at the Atari's graphics modes, we might as well start at the machine itself—with Mode 0.

This is the default mode, the one which appears when the machine is switched on and no program is present. It's a large blue rectangle with a black border, and text appears on it in light blue.

Although Mode 0 is one of the graphics modes and is evoked by the command GRAPHICS 0 (or GR 0), it is more usually thought of as a text mode. It is used mostly for entering and displaying the letters and numbers which make up text, although it does have some graphics capabilities as we'll see later in this series.

The blue rectangle can be thought of as the piece of paper on which you write your text. Unlike ordinary paper,

though, you can't write freely across the screen.

In fact it's a more like graph paper divided up into little boxes. Many letters that we have to fill in these days have rows of boxes where you write your information, and usually there is an instruction to write only one character in each box.

A text screen is like that, and Mode 0 has 24 rows of boxes with 40 boxes in each row. However, you may have noticed that the word READY doesn't appear at the leftmost edge of the screen.

Unless you do something to alter it, the default setting is for only 38 characters in a row. The missing two

characters form a margin along the left-hand side of the screen.

If you want to count the boxes as a row, type the numbers 1234567890 repeatedly. As you type the fourth 8, the cursor moves to the beginning of the next row.

Alternatively, type in Listing 1 and Run it. This will print the numbers for you, and we'll use it again in a few moments.

It's quite easy to give yourself the full 40 characters. The size of the left margin is held in memory location \$2, and you can see how big it is normally by typing:

PRINT PEEK(\$2)

and pressing Return. This should print the value 2 on the screen.

We can alter the contents of a memory location using the POKE command, as long as we specify what number to enter there. So if you type

POKE \$2,0

and press Return, the word READY will appear at the very edge of the screen.

If you entered Listing 1, it should still be in memory unless you've since typed None. Run the program again, and this time the 40 numbers will fit neatly across the screen.

We can work the same magic on

```
10 FOR I=0 TO 4
20 PRINT "1234567890"
30 NEXT I
```

Listing 1

```
10 GRAPHICS 0
20 FOR I=0 TO 39
30 METCH=I/10
40 FOR J=0 TO 39:NEXT J
50 NEXT I
60 MPRINT:0
```

Listing 2

the right-hand margin using memory location 83. If you enter:

PRINT PEEK83

this will usually return the value 39 indicating the rightmost column. Remember, spacing starts at 0 which is why location 83 doesn't contain the value 40.

If you enter:

POKE 83,10

and press Return, this will set the right-hand margin to column 10. Assuming that location 82 still holds the value 0 that you Poked in earlier, the effect of the poke to location 83 is to give you a screen which is effectively only 11 columns wide.

The blue rectangle stays the same size - it's just that you can't type on so much of it now. To see the effect, try running Listing 1 again.

If you've been playing about with locations 82 and 83 and want to get back to the default values you can always press the Reset key. This will (usually) set the values without losing any program you had in memory.

Before leaving the text aspect of Mode 0, try:

POKE 758,4

Normal service can be resumed as soon as you return location 758 to its more usual value of 3 - or press Reset if you find it hard to type in Outback Mode!

The Atari has several registers which hold information about various things. Five of these contain information on colours. They are numbered from 0 to 4, and colour register 2 holds the colour in which the Mode 0 screen appears.

We could POKE particular locations to change the colour, but Atari Basic offers us a more elegant method - the SETCOLOR command.

To use this command we need to know three things: the register number which we want to affect, the colour number which we want to set there, and how bright we want the colour to be.

These three parameters must follow the command in the order in which I've given them.

The default colour for register 2 is colour 9, the blue you know and love. To change this colour, all we need to do is key in:

SETCOLOR 2,4

If you've just entered this, your screen is now aglow with colour 4, or

pink as we call it. If you want to get rid of colour altogether, try:

SETCOLOR 2,0

This produces a very dark grey and the Mode 0 screen blends with the border to give the effect of a much larger screen. Of course, text can still only be entered in the area which is usually coloured.

If you enter Listing 11 and Run it, you'll see the screen cycle through the range of 16 colours available before returning you to the default colour. Notice that Listing 11 uses the same line numbers as Listing 1: it will overwrite it in memory.

Only the second parameter, the one controlling the screen colour is varied. The luminance remains at value 0 for each colour displayed.

Incidentally the purpose of line 40 is simply to keep each colour on the screen long enough for you to see it. If you remove line 40 and run the program, your screen will appear to

Thank Atari for a decent reset function which many other micro owners would envy

flash as the colours are displayed at very high speed.

The colour information for the Mode 0 border is held in register 4 and we can alter this in the same way as the text screen. Enter:

SETCOLOR 4,0

and you will have a completely black screen. Now try entering:

SETCOLOR 4,4

This alters the register controlling the border colour so that it now contains colour 4 - the colour we usually associate with the text portion of the Mode 0 screen.

Well, we've had a good-down test so we might as well have the usual colour relationships reversed too! Reset will restore the registers to their default values - or maybe you prefer having white text on a black background.

We can make the border cycle through the available colours by simply changing line 30 in Listing 11 to read:

30 SETCOLOR 4,A

That is, by changing the colour in

register 4, we alter the border colour rather than the screen colour.

The brightness of the letters on the screen is controlled by the contents of register 1. However, the colour of the letters is always the same as the colour of the text screen.

If we set the luminance parameter of register 1 to a bigger number than the luminance parameter of register 2, then we (probably) get light text on a dark background.

If we set register 1's luminance to a smaller number than register 2's, we (probably) get dark text on a light background.

To see this effect, press Reset and then enter:

SETCOLOR 1,0

This produces a gold screen with pink text. If you now enter:

SETCOLOR 1,4

the screen stays the same but the text changes to a darker colour.

So why use the word 'probably'? The luminance parameter can range from 0 to 15, but only even numbers are valid. If you enter an odd number the luminance is set to the number you entered minus 1.

This means that if you set register 1's luminance to 8 and register 2's luminance to 8, then both are effectively set to 8.

If you change line 30 in Listing 11 to read:

30 SETCOLOR 1,4

and run the program, you'll see the text cycle through the luminance values. Slightly speaking, you should change line 30 to read:

30 FOR A=0 TO 14 STEP 2

but it won't do any harm if you don't bother. Each luminance will be displayed for twice as long as each colour was displayed previously.

For the final disappearing act, enter:

SETCOLOR 1,4

Assuming you were back in the blue, the luminance in register 1 is now the same as that in register 2. This means that the text is now displayed at the same brightness as the background.

Unfortunately, the practical effect of this is that the text is rendered invisible. Unless you enjoy trying blind guess Reset once again.

And while you're peering it, say a quiet thank you to Atari for a decent reset function which many other micro owners would envy.

HEXED

HEXED is a hexadecimal loader. It is a very useful utility that allows you to enter, display and execute machine code routines.

Once the program is **RUN**, a menu will be displayed with five options. They are:

1. Enter code
2. Execute code
3. Alter code
4. List code
5. End program

The choice is now up to you. To select one of the options press the corresponding number key.

Option 1 allows you to enter a series of hexadecimal bytes into memory. The first question you'll be asked is:

Start address?

You should now enter the address where your routine begins in hexadecimal without the \$ sign — this is true for all hex numbers entered.

A default address (\$4000) will be selected if you press Return without an address or enter a hex number greater than \$FFFF.

\$4000 is a safe area of memory and should be used to accommodate your first experimental programs.

After the start address has been entered you will be prompted with:

byte?

Here the program is asking you for the hexadecimal number that you want to store in memory, starting at the address you've just selected.

Now you can begin entering your program one byte at a time, pressing Return after each byte.

After each number is entered the byte? prompt is repeated indicating that the previous byte has been entered into memory and that the memory address has been incremented by one. The program is now

***It sounds like
the Black Arts
... and you'll
find something
magical about
KEVIN EDWARDS'
helpful utility
for displaying
and executing
machine code
routines ...***



ready to accept another byte.

When you've entered your program you can quit by entering 5 in response to the byte? prompt. This will return you to the menu.

If you enter an invalid hex number — such as 40G1 — where G is not a hex digit — the message Invalid HEX 1 will be displayed. After which you will be returned to the menu.

Option 2 allows you to examine memory eight bytes at a time.

Again the first question you will be asked is: Start address?

If you simply press Return it will default to \$FFFF.

Let's assume that we've entered 4000. A row of eight bytes will be displayed. Here is a possible output:

00 00 00 00 00 00 00 00

The four digit hex number corresponds to the memory address of the first byte in the row — the A0

The next byte in the row 20 is the contents of location \$4001. And from this I'm sure that you can see that \$4002 contains 80. \$4003 contains 20 and so on.

If you wish to see another row of bytes press any key other than 5, as 5 returns you back to the menu.

Option 3 works in a similar way to Option 1. The difference being that the memory location being altered is displayed along with its contents.

As with Option 1 the prompt byte? indicates that the program is ready for a byte. Now you can begin entering numbers in the same way as Option 1.

Option 4 allows you to execute one of your own programs.

Again a start address will be requested, this is the address that will be executed.

Since this option can prove deadly a further prompt will ask you if you are

sure that you want to execute the program at the address entered.

Pressing any key other than Y aborts the option and returns to the menu.

If you only enter the message in M/C routine is displayed. Your routine is then called.

If the program returns successfully the message Out of M/C routine will be displayed. After which the menu is redisplayed.

If for some reason the second message doesn't appear and your menu appears to have locked up your routine has failed.

Almost certainly the cause of this is a byte left on the 6802 stack, thus shifting the return address of the program. Hence in considering how the byte got there in the first place the answer is given by the Basic ROM.

Hexer uses the command USB to tell the machine code routine. The syntax of USB is

USB address, b1, b2, ..., bn

There is an option to pass data to the routine by additional parameters b1 b2 ... bn. These parameters are pushed onto the stack in the order bn b2 b1.

Therefore, the number at the top of the stack is b1 and the last is bn - the

```

10 GET ADDR
20 GET 101 ADDR ADDR
30 ADDR
40 ADDRESS 0
50 GET ADDR, ADDRESS
60 GET 00, ADDRESS
100 GET 1 ADDR ADDR
110 GET 1, ADDR ADDR
120 GET 1, ADDR ADDR
130 GET 1, ADDR ADDR
140 GET 1, ADDR ADDR
150 GET 1, ADDR ADDR
160 GET 1, ADDR ADDR
170 GET 1, ADDR ADDR
180 GET 1, ADDR ADDR
190 GET 1, ADDR ADDR
200 GET 1, ADDR ADDR
210 GET 1, ADDR ADDR
220 GET 1, ADDR ADDR
230 GET 1, ADDR ADDR
240 GET 1, ADDR ADDR
250 GET 1, ADDR ADDR
260 GET 1, ADDR ADDR
270 GET 1, ADDR ADDR
280 GET 1, ADDR ADDR
290 GET 1, ADDR ADDR
300 GET 1, ADDR ADDR
310 GET 1, ADDR ADDR
320 GET 1, ADDR ADDR
330 GET 1, ADDR ADDR
340 GET 1, ADDR ADDR
350 GET 1, ADDR ADDR
360 GET 1, ADDR ADDR
370 GET 1, ADDR ADDR
380 GET 1, ADDR ADDR
390 GET 1, ADDR ADDR
400 GET 1, ADDR ADDR
410 GET 1, ADDR ADDR
420 GET 1, ADDR ADDR
430 GET 1, ADDR ADDR
440 GET 1, ADDR ADDR
450 GET 1, ADDR ADDR
460 GET 1, ADDR ADDR
470 GET 1, ADDR ADDR
480 GET 1, ADDR ADDR
490 GET 1, ADDR ADDR
500 GET 1, ADDR ADDR
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690 GET 1, ADDR ADDR
700 GET 1, ADDR ADDR
710 GET 1, ADDR ADDR
720 GET 1, ADDR ADDR
730 GET 1, ADDR ADDR
740 GET 1, ADDR ADDR
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770 GET 1, ADDR ADDR
780 GET 1, ADDR ADDR
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810 GET 1, ADDR ADDR
820 GET 1, ADDR ADDR
830 GET 1, ADDR ADDR
840 GET 1, ADDR ADDR
850 GET 1, ADDR ADDR
860 GET 1, ADDR ADDR
870 GET 1, ADDR ADDR
880 GET 1, ADDR ADDR
890 GET 1, ADDR ADDR
900 GET 1, ADDR ADDR
910 GET 1, ADDR ADDR
920 GET 1, ADDR ADDR
930 GET 1, ADDR ADDR
940 GET 1, ADDR ADDR
950 GET 1, ADDR ADDR
960 GET 1, ADDR ADDR
970 GET 1, ADDR ADDR
980 GET 1, ADDR ADDR
990 GET 1, ADDR ADDR

```

VARIABLES USED IN HEXER

- AP** Contains the hex number which is to be evaluated by the routine at line 1000
- NUMS** Contains the hex byte which is to be entered into memory
- A** General purpose variable
- DFLAG** A flag which tells whether or not the machine code is in operation. 1=yes. Once this is used to change the default address to

\$3998 instead of \$4000 when return is pressed in response to the Start address prompt.

LOOP General loop variable

NUM Address of the hex digit being evaluated

RES Result of the hex subtraction

START Current memory address being increased

low byte of the parameter is pushed before the high byte. And below all of these bytes is the return address of the routine.

The naughty thing about LSR is that an additional byte containing the number of parameters passed is pushed onto the stack just before the routine is jumped to, even if no parameters are specified (when it contains 0).

Thus, even though you've pulled your parameters from the stack when the RETURN from Subroutine (RTS - SBC) is executed, the return address is incorrect and the 6502 jumps to the wrong area of memory.

The remedy to this is to pop a byte off the stack with PLA before executing the RTS - to remove the offending byte.

So the end of all your routines should have the following two bytes:

00 - PLA (remove the extra byte)
00 - RTS (return back to caller)

Without these bytes your programs will almost certainly hang up.

Option 2 allows you to exit from HOCR.

And that completes the description of HOCR's commands. Now we'll have a look at the program itself.

The problem with Atari Basic is that it has no command to evaluate or print hexadecimal numbers.

The subroutine starting at line 1000 and ending at 1510 evaluates a hexadecimal number held in the variable A5 and returns with the result in the variable RES.

For example if A5 = C7 and the routine is called the variable RES will contain 12 on exit.

If you remember, pressing Return without entering a hex number causes the program to default to location 54000. Line 1010 of the subroutine is responsible for this. If the string A5 contains nothing (i.e. RES is set to 16384 (54000) and the routine is called.

Another check the routine performs is to see if the hex number has more than four digits. If it has the routine multiplies A5 and jumps to line 1050 which in turn sets RES to 16384 and exits. This is done because the 6502 memory processor

character and result after subtract

character and ASCII code	result after subtract
0 48	0
1 49	1
2 50	2
3 51	3
4 52	4
5 53	5
6 54	6
7 55	7
8 56	8
9 57	9
A 65	10
B 66	11
C 67	12
D 68	13
E 69	14
F 70	15

Table 1

can only address location 0 to \$FFFF.

Now the number must be validated. This is done by scanning through each character in the string checking to see if it is a valid hex digit (0-9, A-F).

If an invalid hex digit is found a message is displayed indicating so. The FOR TO loop and GOSUB address are then popped off the Basic stack and the routine RETURNS to the menu - see line 1080.

As each character is accepted a number is subtracted from its ASCII code. The number depends upon the character.

If it is a numeric character 0-9 (ASCII codes 48 to 57) 48 is subtracted - to get a result in the range 0-9. If it is an alphanumeric character A-F (ASCII codes 65 to 70) 65 is subtracted - to get a result in the range 10-15.

All that does is change Atari

characters 0-9 and A-F into their corresponding numeric values. See Table 1.

The result of this is then multiplied by 16 to the power of the LSPgh of the string A5, minus the actual position minus 1 - the most significant digit is at the start of the string and not the end.

Have a look at Diagram 1.

So from the diagram you can see that $813C3 = (1 * 4096) + (3 * 256) + (12 * 16) + (12 * 1)$.

This is exactly what the program does with the hex digits in A5.

So now from the routine RES has the result.

The other important routine outputs a byte in hexadecimal - line 2000-2010.

On entry the variable A contains the number to be printed. This is split into two nibbles (two 4 bit numbers). The two four bits of A make one nibble (the upper nibble) and the lower 4 bits make the other (the lower nibble).

Splitting the byte in this way allows us to print two hex digits because each nibble directly corresponds to a hexadecimal digit.

Now we have to do a print the Atari character that corresponds to each nibble.

If the nibble is between 0 and 9 we add 48 to it to get an Atari character 0-9. If the nibble is between 10 and 15 we add 65 to get an Atari character A-F. This is all done by another subroutine which starts at line 2040.

Line 2010 extracts the upper nibble from A and prints it. The same routine in line 2020 and 2030 for the lower nibble.

The main body of the program is responsible for prompts and simple validation.

If you're wondering what line 60 in the program does the simple answer is it GPNs a keyboard hit for input. This is done to allow us to wait for a key depression by issuing a GPNP A command. After which the variable A holds the Atari code of the key pressed.

Anyway it's time for you to try out your own programs using HOCR. Happy Coding!



Diagram 1

WELCOME to the first in a series of articles in which we hope to take the regulatory out of understanding the fundamentals of the Atari's workings.

All too often even competent Basic programmers tend to shy off such topics as binary coding, hexadecimal and assembly language because it seems too mathematical.

This is a great pity because the Atari is so constructed that a little knowledge in these fields allows you to take full advantage of its advanced facilities.

The mathematical aspect of the subject isn't at all deep — certainly anyone who can follow Basic should be able to cope with this series.

If you feel that despite our best efforts we still haven't explained something fully enough, please write in and tell us — we'll try to rectify the situation in later articles.

First we are going to look at binary code — a way of handling numbers essential to our understanding of what goes on inside a computer.

Binary is just a way of coding numbers in a way particularly suitable for computers. It is actually quite simple. What often confuses beginners is the fact that the binary system codes numbers in a way that can look extremely like the way we normally code numbers.

For example, if you were presented with a number 100, you would probably decode it as your normal way and say it was "one hundred".

That, however, is just one way of interpreting it. If you decided to decode it as a binary number you would interpret 100 as a completely different way and say it means the number "four". (We'll avoid exactly how you arrived at that conclusion for the moment.)

This is what often causes problems — people are so used to dealing with their numbers in the normal way that 100 is always "one hundred" to them and they can't make the shift necessary to decode it as binary as "four".

Actually it's rather unfortunate. Presented with 100 do you interpret it as "one hundred" or "four"? Our rule will be, if you mean an usual way of dealing with numbers (the hundred, one and eight you learned at school — or put it more formally, the

It all adds up to binary code

Part One of MIKE BIBBY's easy-to-follow series looks at the number system at the heart of your Atari

binary system? you write the number in the normal way.

If you wish the number to be decoded as a binary number you put the symbol % in front of it — 100 means "one hundred" while %100 means "four".

So far so good. We now have a number (%1) to warn us that we have to decode the number as a special way as a binary number.

However, before you decide you need a rule for decoding — so how do you get the number "four" from (%100)? What is the rule?

Let's take a detour for the moment, and think about the coins we use every day. Our currency consists of these coins:

10p, 20p, 10p, 5p, 2p and 1p. We can combine them to give any sum we wish. For example:

75p is 10p + 20p + 5p
or 50p + 10p + 10p + 5p

and so on. We are all familiar with this — after we use multiples of coins to make up a sum. For example, 5p can be 2p + 2p + 1p.

Using the same coin logic though often means that we end up carrying unnecessarily amounts of change and I for one don't like doing that.

Sometimes, however, with our present coinage system we have to use the same coin more to obtain certain sums. You cannot, for instance, make up the sum of 4p without doubling up on coins. To avoid repeating coins we would have to invent a 4p coin!

Let's do that in fact, let's invent a coinage system where you never have to use the same coin twice.

First of all we would need a 1p coin and of course a 2p coin because we cannot use 1p + 1p for

2p — it breaks the rule!

Now 3p can be made up of 1p + 2p, but for 4p we'll have to invent a 4p coin.

Equipped with that we can make 5p (1p + 4p), 6p (2p + 4p) and 7p (1p + 2p + 4p). In obtaining 4p we used all our available coins so now we have to invent an 8p coin. If you work it out (and I suggest you have it go) you will find that with the coins you have at your disposal (1p, 2p, 4p, 8p) you can make any sum up to 15p. Then you would have to invent a new coin 16p.

Notice how the coins we have created have doubled in value: 1p, 2p, 4p, 8p, 16p. No prizes for guessing what the next one is.

Let's summarise our results in a table (Figure 1). Here I have used the columns to show the coins available and the rows to show how the various totals are made up. A 1 in a particular column means that we use that column's coin, and 0 means that we don't use it. Look at the row for 15p (101) on it. According to our rule, the mental we pack out the coins 4p and 1p (and NOT 2p) to make up the 5p total.

	4p	2p	1p
%	1	0	1
→ 5p			1p = 5p

Now let's get back to computers by dropping all this talk about coins and redraw Figure 1 to show the same information but without referring to money — just numbers. Figure 1 is the new table.

As you can see there is little change, and we can use this table to encode numbers in general, not just coins. We call this method of encoding the binary system.

Remember, to show that we mean

binary number we precede it with %.
So if you see for example %101
means

$$\begin{array}{r} 4 \quad 2 \quad 1 \\ \% \quad 1 \quad 0 \quad 1 \\ \rightarrow 4 + 1 = 5 \end{array}$$

that is we add together the values of
the columns containing 1. Look at
row 5 of the table to check it.
Similarly %1101 would mean 13 in
the binary system since

$$\begin{array}{r} 8 \quad 4 \quad 2 \quad 1 \\ \% \quad 1 \quad 1 \quad 0 \quad 1 \\ \rightarrow 8 + 4 + 1 = 13 \end{array}$$

By now you should be able to work
out for yourself why %100 represents
four. From the table, or by using the
addition method I've just illustrated,
see if you can decode the binary
values of the following binary
numbers

%1001
%101
%11
%1001
%111

You can use the program
accompanying this article to check
your results. You've probably noticed
by now that in the binary system you
only use two symbols (0 and 1) to
encode numbers - hence binary (be-
for two to in bicycle).

You can't encode any number that
you want in binary - just use more



	COINS			
	8p	4p	2p	1p
1p				1
2p			1	0
3p			1	1
4p		1	0	0
5p		1	0	1
6p		1	1	0
7p		1	1	1
8p	1	0	0	0
9p	1	0	0	1
10p	1	0	1	0
11p	1	0	1	1
12p	1	1	0	0
13p	1	1	0	1
14p	1	1	1	0
15p	1	1	1	1

Figure 1

Binary Value	Columns or the Values				Decimal Value
	8	4	2	1	
1				1	1
2			1	0	2
3			1	1	3
4		1	0	0	4
5		1	0	1	5
6		1	1	0	6
7		1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
10	1	0	1	0	10
11	1	0	1	1	11
12	1	1	0	0	12
13	1	1	0	1	13
14	1	1	1	0	14
15	1	1	1	1	15

Figure 2

columns (or bits, as we say in computer jargon) remembering that each new bit is worth double the preceding bit.

However, it does get terribly cumbersome. For example, 100 (denary) encoded in binary is %1100100 since

$$\begin{array}{r} 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \\ \% \ 1 \ 1 \ 0 \ 0 \ 1 \ 0 \ 0 \\ \Rightarrow 64+32+4=100 \end{array}$$

It is much easier to handle the number in our normal system. To a computer this presents no problem and the fact that binary only uses two symbols is a bonus because you can represent numbers with a sequence of switches.

Switches are what we call "two state" — they're either ON or OFF. If we have a sequence of four switches together we can encode numbers by having them either ON or OFF. We could use ON to mean a 1 and OFF to mean a 0 in a particular column.

$$\begin{array}{c} 8 \quad 4 \quad 2 \quad 1 \\ \text{ON OFF ON ON} \\ \Rightarrow \% \ 1 \ 0 \ 1 \ 1 = 11 \end{array}$$

Each of these switches represents a bit, and a computer memory is full of bits. The 6802, which is the microprocessor at the heart of the Atari system, deals with many thousands of them.

To make things simpler, the 6802 handles the bits in groups of eight bits at a time — the group of eight being called a byte.

With this type of organization, the largest number you can store in a byte is 255 since

$$\begin{array}{r} 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \\ \% \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \\ \Rightarrow 128+64+32+16+8+4+2+1=255 \end{array}$$

Of course the computer can handle

larger numbers, but not just whole numbers! But to do so it must use more than one byte.

Converting a byte from binary to denary is fairly straightforward. Simply write it down under the appropriate columns for bit values and add together the value of all the columns in which a 1 occurs. For example, guess %10010101 you translate as follows:

$$\begin{array}{r} 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \\ \% \ 1 \ 0 \ 0 \ 1 \ 0 \ 1 \ 0 \ 1 \\ \Rightarrow 128+16+4+1=149 \end{array}$$

Going from denary to binary is not at all difficult, but is rather hard to put into words. You do it by subtracting from the number you want to encode the value of each column at turn, starting with the highest (i.e. 128, 64, 32, and so on).

If you can subtract a particular column value you put a 1 in that column and continue to subtract the next lower column value from the remainder.

If you cannot manage the subtraction you put a 0 in that column and try to repeat the subtraction with the next lower column number.

So starting with the highest column number (128 in our case) you

1. Attempt to subtract the relevant column number (highest first).
2. If you succeed THEN put a 1 in that column number and continue to subtract other columns from the remainder. Otherwise put a 0 in that column.

Figure 18 should make it clearer.

In practice, when faced with encoding a number from denary to binary I tend to do it in my head using which column values will add together to make the sum required starting with the highest first.

For example, if I were to encode 161 in binary I would say "Well I can use 128 so that leaves me 33 to add. 32 can be made up of 32 and 1 so that does it: 128+32+1=161. So I encode it as

$$\begin{array}{r} 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \\ \% \ 1 \ 0 \ 1 \ 0 \ 0 \ 0 \ 0 \ 1 \\ \Rightarrow \%10100001 \end{array}$$

After a while you'll find this very quite simple.

To finish off, I'll leave you with a program to print out the binary value of a number between 0 and 255 (i.e. that can be stored in one byte). Try it with various values and see if you can

```

10 REM ***
20 GOSUB 5
30 OPEN "A:",4,"R:"
40 P=PRINT:PRINT
50 PRINT "0,0"
60 PRINT "NUMBER:"
70 INPUT NUMBER
80 IF NUMBER<0 OR NUMBER>255
90 PRINT "NUMBER OUTSIDE 0-255"
100 GO TO 30
110 PRINT "0,0"
120 FOR LOOP=7 TO 0 STEP -1
130 REVERSE=NUMBER<>LOOP
140 IF ANDNUMBER<1 THEN GOSUB=REVERSE<1:DATA 128
150 IF 1 THEN
160 NEXT LOOP
170 PRINT REVERSE
180 P=" "
190 IF NOT KEY FOR NEXT NUMBER
200 GOTO 30
210 GOTO 30
    
```

accept the results.

The program does P once one or two digits, that may not be too familiar to you, so yet.

Worry not, future articles in Atari User will cover them. Watch this space.

140	
128	128 guess - set to 0
31	64 32 guess - set to 0
16	16 guess - set to 1
8	8 can't go - set to 0
4	4 guess - set to 1
2	2 can't go - set to 0
1	1 guess - set to 1
0	

128	64	32	16	8	4	2	1
1							
	1	1					
			1				
				1			
					1		
						1	
							1
1	0	0	1	0	1	0	1

Figure 18



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PETE BIBBY examines the Atari's sound chip and reports, regretfully . . .

All you'll already know, your Atari more is a clever little beast. One of the cleverest things about it is the sound chip it contains which allows all manner of wonderful (and not-so-wonderful) noise to accompany your programs.

However there's always a fly (or is it a bug?) in the ointment of microcomputing. With Atari spared it's the fact that, at first sight at least, using the sound facilities needs as big somewhere near genius.

In point of fact when you take the time and trouble to get to know it you'll find that although the sound chip is complex, using it needn't be all that complicated. You just have to take it one step at a time.

However, at first sight all the PEEKs and POKEs and registers can be quite off-putting to the would-be Atari musician. This is a pity because you can achieve a fair command of Atari sound using just one simple BASIC command: the aptly named SOUND command. This is the one we'll be exploring in this article.

The SOUND command takes the form

SOUND channel, pitch, duration, volume

Don't worry too much about the parameters following the SOUND. We'll deal with those later in the article. For the moment, think of the sound of your Atari by typing

SOUND 0,200,10,0

and pressing Return.

Unless you're deaf, you'll notice two things. The first is that the note produced carries from the television if you don't believe me, by turning the TV's volume control and hear the difference.

The second thing you'll find the rest of the family will become aware of is the fact that the note carries on. And so. And so.

A quick glance at our formula for

It sounds easier than it looks

the SOUND command shows that there is no parameter controlling the length of the note it produces.

Other muses have a duration parameter. The Atari has none. So when you enter a SOUND command directly into the memo, the note just carries on.

By this time the note produced by

SOUND 0,200,10,0

will probably be getting on your nerves. There are three ways to stop it, not counting a sledgehammer. The first two are either to switch off the memo, or hit the Reset button. The trouble is that these are a bit drastic.

A much more elegant solution is to use

SOUND 0,0,0,0

which in effect tells channel 0 to shut up. But now I'm getting ahead of myself, as we haven't met channels yet.

As you'll know from some of the games you've played, your Appleton is limited to playing just one note at a time. It can produce some quite complex harmonies using up to four notes simultaneously.

This is possible because the Atari's sound chip has four channels, each channel being able to produce a separate note.

The channels are numbered from 0 to 3 and we select which channel a SOUND command uses by putting the appropriate number in its channel parameter. So ignoring the other

parameters which we'll come to shortly)

SOUND 0,200,10,0

used channel 0 while

SOUND 1,200,10,0

plays its note on channel 1. Notice that to switch off the sounds you have to use

SOUND 0,0,0,0

for channel 0 and

SOUND 1,0,0,0

for channel 1.

The more suspicious of you may think I'm cheating. After all the note was the same on both channel 0 and channel 1. Maybe there's only one channel!

For the Doubting Thomases among you I'll jump ahead a little and use some of the other SOUND parameters to play a chord using notes on all four channels:

SOUND 0,340,10,0

SOUND 1,180,10,0

SOUND 2,160,10,0

SOUND 3,120,10,0

Now do you believe me? If you switch off the notes with

SOUND 0,0,0,0

SOUND 1,0,0,0

SOUND 2,0,0,0

SOUND 3,0,0,0

you'll not hear the four channels if you see what I mean.

So to sum up, we've found that we

can use the **SOUND** command to make a noise on one or more of four sound channels. This noise carries on until we switch it off with the appropriate

SOUND channel,0,0,0

where channel takes a value from 0 to 3

Incidentally, have you tried using other channel numbers such as 5 or -1? It is not allowed. You'll find you get an error 3 message.

When we played our four note chord earlier you may have noticed that each **SOUND** command had a different pitch parameter. Channel 0 had a pitch parameter of 240, channel 1 had one of 160 and I leave it to you to figure out the pitch parameters for the remaining two channels.

It's the pitch parameter that decides how high or low the note is going to be. It can take values from 0 to 255. The bigger the number, the lower the note produced; the smaller the number, the higher the note becomes.

SOUND 1,240,0,0

and after a short delay

SOUND 2,16,16,0

and you'll hear what I mean.

For the musically inclined, the range of values from 0 to 255 gives over three octaves, with middle C being equal to 121.

The trouble is that there is no standard increment or decrement in the pitch parameter which corresponds to a semitone. You either have to look them up in a table or play them by ear to prefer the second technique.

There is one rule that the pitch parameter does follow, and that is the rule of octaves. If you halve the value of a pitch parameter you get the same note an octave above. If you can't follow that or don't know when an octave is playing

SOUND 0,240,16,0

followed successively by

SOUND 0,120,16,0

SOUND 0,60,16,0

SOUND 0,30,16,0

should show you.

The more inquisitive may wonder what happens if you carry on the above experiment and enter

SOUND 0,15.5,16,0

Try it and see. The Atari expects

whole numbers in the pitch parameter. In this case it rounds 15.5 up to 16.

As we said, the pitch parameter can vary from 0 to 255, with 255 giving the lowest note, 1 the highest and 0 silence. What happens if we wander outside this range?

If we use a negative pitch parameter, the micro doesn't like it and comes back to you with an error 3 message. However, if we use a number higher than 255 then rather than bring things to a halt, the micro keeps on taking 256 away from the excessive pitch parameter until it is within range. More technically, it takes the pitch parameter MOD 256. Hence

SOUND 1,266,0,0

produces the same note as

SOUND 1,10,0,0

and

SOUND 1,254,0,0

even though the pitch parameters involved are vastly different.

Now that we've got halfway through the parameters of the **SOUND** command, let's use them in a program such as Program 1. Type it in and Run it.

10 REM PROGRAM 1

20 SOUND 0,240,0,0

30 SOUND 1,160,0,0

40 SOUND 2,112,0,0

50 SOUND 3,120,0,0

Not very exciting, is it? It's all over in a flash.

What has happened shows us the way the **SOUND** command differs according to the circumstances in which it is used. When it is entered directly into the micro, as we were doing up until Program 1, the notes produced just carry on and on unless we stop them or play another note on that channel.

However, when we use them in a program, the notes produced last only as long as that program. When the

program ends, so does the note.

Try extending the life of Program 1 with a delay loop such as

60 FOR DELAY=0 TO 100000: NEXT

and you'll hear the chord.

This is the method of getting round the afore-mentioned lack of a duration parameter. Careful use of varying delay loops can ensure that the notes produced by a **SOUND** command are as long or short as we desire.

Not enough of this making up for a parameter we lack, there are still two parameters we haven't discussed yet involving distortion and volume.

The distortion parameter actually distorts the sound played by a channel. Taking values that range from 0 to 14 in steps of 2, it is the distortion parameter that allows the Atari to produce all the special effects sounds like explosions and machine guns.

Program 1 will let you hear it at work. Try it out with notes of pitch other than 200 and hear its effect.

10 REM PROGRAM 11

20 FOR DISTORT=0 TO 14: STEP 2

30 PRINT DISTORT

40 SOUND 0,200,DISTORT,15

50 FOR DELAY=0 TO 10000: NEXT DELAY

60 NEXT DISTORT

You'll notice that a distortion of 10 gives an almost pure note. Hence I've been using it in the examples so far. A distortion of 14 is also acceptable as an undistorted tone.

As before, if you use a negative distortion you're rewarded with an error 3 report for your pains. If you use values outside the range you'll find that the Atari uses the distortion MOD 16. This means that

SOUND 0,200,26,15

produces the same note as

SOUND 0,200,10,15

The last parameter in the **SOUND**

ERROR 3

If we use a negative pitch parameter the micro doesn't like it



STING...



100 1 000000000000 100

400 000 000000000000

400 000 100 00 00000 000 10 0

400 0000 0,00,0,0

400 0000 0

400 0000 0,0,0,0

400 000 100 00 000000 0

400 0000 0

400 000 000000000000

400 000 000 100 000

400 0000 0,0000000000,0,0

400 0000 0

400 0000 0,0,0,0

400 00000

400 000 0000 00000

400 000 100 100 000

400 0000 0,000,0,0

400 0000 0

400 0000 0,0,0,0

400 0000 0,0,0,0

400 00000

400 000 0000000000

400 000 0000 100

400 0000 0,0,0,0

400 000 000 100 000 0

400 0000 0,0,0,0

400 000 000 100 00000 0

400 0000 0,0,0,0

400 0000 1,00,00,0

400 000 000 100 00000 0

400 0000 0,0,0,0

400 0000 0,0,0,0

400 0000 0,0,0,0

400 0000 0,0,0,0

400 0000 0,0,0,0

400 0000 0,0,0,0

400 0000 0,00,00,0

400 0000 1,00,00,0

400 0000 0,00,0,0

400 0000 0,00,0,0

400 000 000 100 00000 0

400 0000 0,0,0,0,00000 0,0,0,0,00000

400 0000 0,0,0,0

400 00000

400 000 0000

400 000 100 100

400 0000 0,0,0,0

400 000 100 100

400 0000 0,0000 0

400 000 1000 100 0000 -0

400 0000 0,0,0,0

400 000 100 100 00000 0

400 0000 0

400 0000 0,0,0,0

400 00000

400 000 00000000

400 000 100 100

400 0000 0,00,0,0

400 000 100 100 00000 0

400 0000 0,0,0,0

400 000 100 100 00000 0

400 0000 0

400 0000 0,0,0,0

400 00000

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400 000 100 100

400 000 100 100

400 0000 0,0,00,0

400 0000 0

400 0000 0

400 0000 0,0,0,0

400 00000

400 000 00000000

400 000 000 100

400 0000 0,00,00,0

400 000 000 100 00000 0

400 0000 0,00,00,0

400 000 000 100 00000 0

400 0000 0

400 0000 0,0,0,0

400 00000

400 000 00000000

400 000 000

400 000 000 000

400 0000

400 00 00000000 0000 0000

400 0000 0,0000,00,0

400 0000 0

400 0000 0,0,0,0

400 00000

400 000 000000000000

400 000 1000 100

400 000 000 100

400 0000 0,0,0,0

400 0000 0

400 0000 0,0,0,0

400 00000

400 000 00000000

400 000 000 100

400 0000 0,00,00,0

400 0000 0,00,00,0

400 0000 0

400 0000 0,0,0,0

400 0000 0,0,0,0

400 00000

400 00000

400 00000

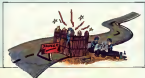
400 00000

400 00000

400 00000

400 00000

400 00000



Tired of typing?

Take advantage of our
Organizing offer on Page 81.

ENGLISH Software has released three volumes of **Atari Smash Hits**, but we've only had Volumes 2 and 3 until the review so I won't be saying much about Volume 1.

All three volumes contain just about Jack, probably the best-known of the games. In fact, if you haven't already got Just-Best Jack it might be worth buying one of these volumes to fill the hole in your collection.

In addition to being a good game, it has several features which other manufacturers would do well to copy, like the facility to set the skill level and the option to skip level levels.

As well as Jack, Volume 2 contains four other games to keep you amused. They're not all arcade games either.

Stepped is an adventure game in which you play the part of Special Agent Sid - even if you are a woman! You've been dumped on a strange planet and your mission is to return home safely.

The game uses fairly simple line drawings as the top half of the screen, with the location descriptions, and commands appearing on the lower half.

There's a Help facility if you're stuck although the hints aren't always very useful, and the game can be saved and reloaded at any point.

Meanwhile, back at the joystick, Diamonds tests you in the role of Digger (an the prospering man). Your task is to exploit all the diamonds while avoiding such diversions as Mines, the Ball and Pin the Flier.

There are 16 levels; it will keep you busy for some time. There is a pause facility which I found essential so I could have a rest-est because the game seems to be very slow at reaching the joystick - as though its written in Basic! This resulted in my applying extra pressure, hence the need for a break.

The Adventures of Robin Hood is not actually an adventure game. Robin's task is to collect the bags of silver and kiss Maid Marian while avoiding the arrows of the Sheriff's men.

He moves along a horizontally scrolling landscape and

SMASH HITS 3 COLLECTS THE LOLLIPOP



has an amazing ability to climb up trees and buildings. As the levels increase, so do the number of bags of silver to be collected. The ball level can be selected.

I must admit I got bored very quickly with this one despite the interesting Old English computer music.

Crash! Warrior, the last of the five on Volume 3, is a two-dimensional scrolling maze which you must explore in order to defuse the explosive bombs. Since only part of the maze is visible on the screen, you've got to remember where the ball bumps are.

Your fuel is used up at an alarming rate - a lot like driving a Range Rover. Also coming into contact with the walls uses more fuel, and there

are security robots to avoid.

It's a familiar theme necessarily well implemented. The only thing which spoiled the game for me was the fact that when you come in contact with the wall, the whole screen jitters. After a while this had a horrible effect on my eyes. (Still, I'll play it a bit and not ask for it.)

After the obligatory Just-Best Jack, Volume 3 gets under way with Asteroids 2 (in Russian) and out of Bonanza! Unlike some versions, this one gives you a limited supply of missiles and bombs.

It's a good game if you like that sort of thing - which I do. What a pity the game made its debut by flying through being obsolete, otherwise you might have played some better on

strategy. Still, it's nice to see what will await you at the further reaches.

Bully Buddies was a delightful surprise since I hadn't encountered it before. It sounds simple - you have to build a wall by catching bricks as they fall off a conveyor belt.

However, to be successful requires speed accuracy and some strategic thinking. The bricks drop quite fast and are deadly if they hit you. In order to catch them, you must be directly below with your arms raised.

There are four shades of brick, and in order to maximize points, you must build the wall in a set pattern. If you don't throw the bricks accurately, they don't always end up where you intended and may

will repeat the pattern.

You must also consider the pattern in deciding whether to attack any particular block, or be quick to move out of its way.

On level 1 you only have the blocks to contend with. On higher levels — there are eight altogether — there are boxes of TNT moving around your legs to make life difficult.

The TNT makes level 2 a lot harder than level 1 — I would have preferred a more gradual transition between levels. Even so, it is still a good game.

By including *Inside Of The Dragon*, Volume 3 uses a technique borrowed from the video industry. It's not uncommon for a greatest hits album to contain one previously released track so why should software houses be any different?

The game is a sort of adventure game but requires arcade type skills. You are trapped in the inner circle of a double maze which you must explore in order to find enough provisions to see you through the winter months — always ensuring you can find the door.

The dragon is just one of the hazards to be avoided as you roam around. The walls and ceilings are filled to the brim as are the middle inner levels with the giant snakes and other assorted hazards.

It is one of those games which take a while to develop skills but the various skills — like jumping over the obstacles without hitting the ceiling.

The instructions leave you to work out the various possible movements and a few a while before it realised I could be down — not like me at all.

Once you get the hang of it then the six selectable skills begin to keep you busy late at night.

Finally on Volume 3, *Dragon's Daughters* is a new recipe for an integral sequence who describe dragons — through the girls on the side of his back. I suppose if you're going to have girls you might as well have them there.

You are warned (or should I say threatened) of an unlimited supply of weapons with which

to do battle. The fees include rubber plants, an octopus which only gets stunned by the harpoons and other monsters.

The action obviously takes place off shore from Sheffield because the monsters are as big as the Imperial Household Strategy aside though the game is challenging enough to be fun.

be fun.

The cassette version of each volume costs £14.95 with the equivalent disc being £17.95. Of the two volumes I've looked at here I prefer Volume 2 and would consider it worth better value. It contains two games that I'd play again, which works out at

about £3 a game on the tape.

I'd only go back to that of the games on Volume 3 but because it contains a traditional adventure it might well appeal more to some people than Volume 1. Either way you pay your money and you get a fair bit of choice.

Dave Russell

The Silicon Dream gets off to a pretty good start

If you go by the number of locations *Snowball* must be one of the biggest adventure games ever. It boasts over 7,000 of them, but fortunately you don't have to map the complete set.

According to Level 9, the action takes place around a sinking ship could actually work. Not having the freedom to check the comments I'll take their word for it.

The *Snowball* is an off-nominal interwar frigate ship containing two million frozen corpses. You play the part of Special Agent Kim Karabell, whilst the ship is in transit.

The fact that you've been frozen means that something is wrong. It's your job to find out what's happened and save the lives of the passengers.

Being based on a working model, the problems to be solved in *Snowball* are logical rather than magical. However, as the manual suggests, some of the technology used might be described as magical in 1985's terms.

You start the game in your coffin and your first problem is to get out of it. Pretty soon you

encounter the Nightlegion, a lethal variety of robot that polices the starting materials.

The game follows the classic adventure style in that you are awarded points for certain actions. There is a maximum score of 1,000 but you can complete the game with a less than perfect score so it's not like having to collect a given number of treasure.

Level 9 have developed a powerful parsing system, so your input can be a bit more than *Get Sword* or *Get Dagger*. You can even use *!!* to refer to the object of the previous command which saves a lot of time in the long run.

Having said that I collected some anomalies. If you wait a while from the game itself find a safe location and try typing in the alphabet a letter at a time.

Some care has obviously gone into creating the detailed *Kim Karabell* world with pictures on the cover of the manual and a personality profile which is not clear whether Kim is male or female. This means that no matter who is playing the

game they can think themselves into the role.

I really appreciate this aspect — you've not only had up an off-prioritising to be a help-armed robot.

In fact I really enjoyed playing *Snowball* and would recommend it to anyone who likes a good adventure and is fed up with chess and words.

My only complaint is that BBC Micro users get a better deal. Presumably by the use of some clever interrupt programming the *Snow* version of the tape plays a lovely tune while loading.

Given that the official start tape-loads has an audio channel as well — which the conventional levels of language tutorials tend to ignore — Level 9 could have included the tape without even needing the clever programming.

Snowball is the first of a *Silicon Dream* trilogy. The second in the series, *Return to Eden* is now available and it's as enjoyable as *Snowball*. It is out of circulation for the next few weeks.

Elizabeth Dennis



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6502

MIKE COOK takes you on a conducted tour of the Atari micro's power house

LEFT the bonnet of many Formula 1 racing cars and you are likely to see the same engine. OK, the chassis is different, the suspension, gearbox and body are all different, but most of the engines are the same.

This is also true with personal computers. The microprocessor the power house of your computer is the same on many different models. So let's take a look at it and see how it shapes the rest of our machine.

There are two microprocessors which go to make the vast majority of computers — the Z80 and the 6502. In the Atari range the 6502 is used.

This is the same microprocessor as used in the Apple II, Pet, BBC and Electron to name a few. They all share the same engine.

A beginner is often puzzled why they don't all share the same software. Well the answer is simple. They all have different electronic 'bodies' wrapped round them, just like the racing cars.

This makes software written for one machine totally incompatible with any other machine. Let's see how this comes about by looking a little deeper into the structure of the 6502.

The 6502 microprocessor was first manufactured by MOS Technology in the early 70s so it is now well over 10 years old. However that does not mean that it is out of date or old technology, as some so-called experts think. The processor was so advanced when it was designed that only recently has technology been able to make full use of all its features.

It was designed as an improvement on the Motorola 6800 and made some radical changes. The

improvement which was to prove the key to its success was not the power of its software instructions but the ease in which it could be made into a system. That is, it could be made into a computer with the address of very few extra chips.

This made it the natural choice for early computers like the Apple I (yes it really did exist) and the Apple II. Eventually the company that made it were bought out by Commodore, the makers of the Pet.

Given this foothold of popular computers using the processor, quite a number of people became very proficient at programming it and so they chose it for the next generation of computers.

This was possible because the software instructions the processor obeys have turned out to be remarkably powerful. These instructions are known as the instruction set and ultimately govern the power of the machine because everything the computer does must eventually be broken down to these basic instructions. The fewer instructions you need to express a problem the faster the machine will go.

These instructions are very simple, involving operations like moving data from one place to another or adding up two small numbers. Most real things you want to do need lots of these 'small' instructions.

Take for example a program to print 'Hello' on the screen. It is likely that this would take about 20 instructions. To see why this is so we will need to look at how the microprocessor views the outside world.

To a 6502 the rest of the world looks like lots of different pigeon

holes or memory locations. It can only cope with one of these at a time.

It signals to the electronics surrounding it which location it wants to access by setting the address of the location on 16 signal wires.

Each signal wire can be in one of two states: with a voltage on it (5 volts) or with no voltage on it (0 volts). We call these states one or zero. Yes, 5 volts is called one! You see, if we called it 0 then that would imply there was 4, 3, 2 and 1.

These voltage levels cannot exist in the circuit. The circuit can only be in one of two states — that's why we call it a binary condition.

As there are 16 of these address signal wires there are a lot of combinations of zero and one that they can be in. In fact if you work it out this comes to 65,536 or as we say in the jargon 64k. This is because 16 is 1024, a sort of baker's dozen version of 1000.

So anything connected to the microprocessor must fit into this 64k of address space. The wires that signal this address are known collectively as the address bus.

No till quite recently 64k was a vast amount of memory, quite over and above anything that was predictable or affordable.

I remember in 1976 getting a memory board for one of my computers containing 4k of memory which cost twice as much as the Apple 800.

Even so I was impressed at how cheap it was, as it represented quite a big breakthrough at the time.

Nowadays you can get 64k of memory in just two chips, so you see

that technology has only recently caught up with the capabilities of this microprocessor.

The microprocessor examines the memory locations by means of eight signal wires. These carry information to and from the locations in the same sort of binary code and serial signals used on the address bus.

As these wires carry the information, or data they are known collectively as the data bus. So if the microprocessor wants to look at a memory location it puts the address onto the address bus and reads the contents off the data bus.

Conversely if it wants to store some information it again places the address on the address bus and the data it wants to store onto the data bus.

It is up to the electronics surrounding the processor to decide its needs for taking or placing the data on the bus.

So the processor sees everything simply as memory locations. All the devices that make up the computer have to be allocated their own unique address or range of addresses.

This applies to the keyboard, the seven cassette recorder peripherals and whatever else goes to make up your particular computer. It designs these to put these components in different places, or have a different mix of components, then inevitably software becomes incompatible.

As well as the external memory locations, the processor has inside it some internal memory locations. These are called registers, and each one is not given a numbered address but a name.

Admittedly they are not very imaginative names, but they suffice. They are called A (for the accumulator), X, Y, PC (program counter), S (status) and SP (stack pointer).

Each has its own use and every instruction that the processor can execute involves one or more of these registers. They are shown in Figure 1. Let's take a look at what they are used for.

The program counter is the only 16 bit register, and it is used to hold the address of the next instruction. The processor puts this out onto the address bus and fetches the data in that location.

This is in the form of a coded

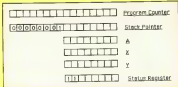


Figure 1 The 6802 registers

instruction but before that instruction is executed the program counter is incremented to point to the next instruction.

This can be complicated by the fact that a complete instruction can be stored in one, two or three successive memory locations.

The first part of the instruction contains the information concerning how many other locations are involved in this way the program counter leaps after itself without any intervention from the programmer.

If any data needs to be moved or manipulated then the accumulator is used. There are instructions to move data from a memory location to the

accumulator and to be derived from there.

The X and Y registers are known as index registers and are used to point to other memory locations. This means that the program can calculate the memory locations to operate on instead of them being fixed when the program was written. This gives the instruction set most of its power.

The way the address of memory to work with is arrived at is known as the addressing mode. The 6802 has quite a few of these and they are at the foot of its power.

The stack pointer is a bit like the program counter, only it points to an area of memory used for temporary storage. It is reformed so that it can only cover 256 memory locations at a fixed address. This register looks after itself most of the time and can usually be left alone.

The status register is different from the rest in that it does not contain numbers as such but a collection of bits. Each bit has its own name and significance.

Whenever any operation takes place the individual bits in the status register change to reflect it. Suppose, for example, we subtract two numbers and the result is zero, then the zero flag (one of the bits of the register) would be set.

The point is that all the conditional instructions work off this status register. For example, if you want to stop a section of code if two numbers are the same, you would use a 'Branch if Equal' instruction which causes a specified number of address

‘If the micro-processor wants to look at a memory location it puts the address onto the address bus’

accumulator and from the accumulator to memory. Data cannot be moved directly between memory locations.

While data is in the accumulator it can be manipulated. This can mean having a value added, subtracted or having individual bits changed. The instruction set also allows multiplying or dividing by two. All other

location to be skipped if the zero flag is set. This then starts the program counter and causes the next instruction to be fetched from further down the program.

The art of using the instruction set to get the computer to do anything is quite involved, and many books have been written concerning machine code programming.

Let's finally look at some of the other features of the 86000 range processor.

There are three signal pins on the processor which can interrupt the program currently being executed. With two of these signals the program can return and continue executing as if nothing had happened. These are known as the interrupt signals.

The simplest uncorrectable interrupt is the reset. Whenever this is triggered the processor will go to a certain address location and look for a

number.

This number it will take as the address to start fetching and obeying instructions. This is the restart address.

The reset line is automatically pulled up by the surrounding electronics. As the reset is held where to go is a memory location we say the interrupt is vectored.

Two other interrupts are also vectored the IRQ (interrupt request) and the NMI (non maskable interrupt). The difference is that the NMI is always obeyed whereas the IRQ can be ignored if the processor has executed an instruction to set a certain bit in the status register, the interrupt inhibit flag.

These interrupts on earlier computers were ignored, but they can be made to make the computer appear to be doing many things at the same time.

For example, suppose we want to

use it as key has been pressed on the keyboard. We can arrange the program to keep looking at the memory location where the keyboard is located. Alternatively we can arrange for pressing a key to generate an interrupt, and then the program comes to see what key is pressed. Therefore we do not need to waste time looking at the keyboard when no key has been pressed.

The video display can generate interrupts to assist the smooth animation found in so many good games. Also the interrupt can be rapidly triggered to keep track of time by implementing a real time clock.

Well, that's a brief look at the engine inside your computer, the device that gives it the power. However remember it is the surrounding electronics that make your computer unique and give it the many added features not found on others.

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We begin off with a program which uses the returned block to keep your satisfaction.

50	Clears the screen, the string "000" and clears the screen
55-60	Present instructions
60	Waits for a key-press
65	Clears out the value of the key pressed
70	Informs the user so that it doesn't make the display messy
80	Clears the screen and picks a random number between 1000 and 2000
90	Waits for a delay determined by the size of the random number. If you wait for the same amount each time, people can quickly anticipate the onset of the signal and artificially reduce their reaction time
100	A precautionary clear-out of the key-press location in order to avoid cheating
110	Prints the signal letter in the middle of the screen
120	Sets the clock to zero
130	Waits for a key-press
140	Looks at the clock location and calculates the elapsed time
150	Clears out the key-press again
160	Clears the screen and gives the reaction time
170-190	Offer another go. Assumes that if the reply goes with the letter Y (upper or lower case) then the answer is yes. And if it starts with an N (upper or lower case) the answer is no. If it starts with anything else, ask the question again
200	Prints goodbye

1000

AFTER one John has been using *Unattractive* for some time, why does my television begin cycling through a series of colours? — **Steve Temple, New Billham, London.**

■ The cycling through a series of colours is called the "stretch mode". This state is a left over from the colour-coded games where it was primarily used to stretch out time.

Atari incorporated this feature not to stretch but rather to prevent the television screen from being permanently "burned" by any bright stationary image which could only happen after many hours of displaying an image.

After that did to ensure your screen would be stretched by including this feature in the design.

Thus, if you do not press a key for approximately nine minutes when it you are using other inputs for example joystick your system will automatically activate the stretch mode and your screen will begin cycling through a series of colours.

This will not occur with Atari programs that only utilize input from the joystick or paddle controllers. These have been designed to go into the stretch mode only if there is no joystick or paddle activity within the nine minutes.

Cleaning up the heads

DS I need to clean the heads of my disk drive? How do I do it? — **P. Jones, Bedford**

■ The heads of your Atari disc

What makes a micro get on its bike...

drive can be damaged by some dust head cleaning tape. The advice authors of these days drives not to use any head cleaning disks.

Clean the head much as you would the head of a tape deck. Gently wipe the head with a bit of cotton, soaked in denatured alcohol.

Let it dry for 30 minutes before using the drive.

Unattractive attract

DS I have designed my own game. How can I eliminate the annoyance of the stretch mode when I am only reporting into the system via the joystick or paddle controllers? — **Quentin Wright, Glenborough, Newmarket**

■ All you need to do is periodically reset the stretch mode clock so that it never reaches the end of its nine-minute stretch. To do this simply add a line with `POKE 77,0` at various points in your programs.

Since this feature is so important you should not eliminate the stretch mode entirely. Instead you should include a routine in your program like the following suite of lines to determine if a

joystick has been used recently.

These two lines should be included at various points in your program.

```
IF JOYSTICK = 0 THEN JOYSTICK = 1
IF JOYSTICK = 1,
```

The first line checks to see if the joystick is in the upright position (the other words unshown). If it is the program will contain an `IF` line and after nine minutes the stretch mode will begin and thus prevent your television screen.

If you have moved the joystick the program will continue automatically to the next line. This line resets the counter so the stretch mode will not begin for another nine minutes.

Random selection

I READ somewhere that the argument to the random function can be anything — it's a "dummy" argument if it is the case why does everyone use `RAND(0)`? — **Shaun Williams, Canterbury, Kent.**

■ You're right the argument is a dummy so you could have `RAND(5)` or even `RAND(LOH)`. Using a zero is quite convenient but it does have the advantage that it's quick to type. Being on the same line as the right bracket that you need to complete the argument.

It doesn't blind you

MY mother keeps telling me that I'm getting too close to the television screen. She says that it will make me go blind if she's true? — **Kevin Black, Dordrecht.**

■ Only if you keep banging your head on the screen.

Seven. To be serious you shouldn't get too near as you could suffer myself. Of course the table on the side of your TV can be used to control brightness. As with everything moderation is to be recommended.

Testing, testing

I AM a bit confused about my 8000X. I can't find programs.

When I type `ATX` and put the memory test on only 40 jobs green boxes appear under the word `RAM`. But the handbook says I should see 40.

Does this mean that most of my RAM is not good, and should I take my system back to the shop where I bought it? — **Jim Connell, Preston, Manchester**

■ Your RAM probably isn't bad because if you type `ATX` you are already using some of it — the "missing" eight bytes are taken up by the Basic language which is built in to your 8000X.

To see the full 48 blocks tested use the other method which the manual gives by turning your memory on while holding down the `OPTION` key. This will produce 48 green blocks — unless some of the RAM really is bad in which case the block will be red.

If this is the case you should take the system back to the shop where you bought it.

User group hints

I THOUGHT your readers might be interested in a few hints and pointers recently at the local user group.

The following round them the

**ATARI
USER**

Mailbag

WE welcome letters from readers — about your experiences using the Atari machines about tips you would like to give or hear other users, and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europe House
441 Chester Road
Hazel Grove
Stockport SK7 5NY

TV each time you press a key can be suppressed with

POKE 721,254

You can turn it back on again with

POKE 721,0

To activate the entire dual character set use

POKE 726,204

To see this set displayed on screen, hold down Control as you press each key. To turn it off and return to normal use

POKE 726,224

To play about the 400 at which the text screen scrolls up in

POKE 822,254-840

To turn it to normal, use

POKE 822,0

You can enter the speed at which the cursor auto repeats as follows:

POKE 700,1 Super fast

POKE 700,3 Fast

POKE 700,5 Normal

I hope your readers can find some use for these — David Eckersley, Tisbury, Wiltshire

Instant eradication

I WAS delighted to hear about the forthcoming magazine and wish you well. I decided to try and be one of the first people to write for you, but since space is so tight as perhaps I am being a little ambitious.

I thought you might be interested in this little routine I wrote to enable unwanted lines to be deleted from a program.

The task of a DELETE command on the Atari is a lot of a pain and I've found this program (below) very useful.

All you do is enter it to the end of your listing by loading it

Curses, no flashing cursor

I AM a BBC Micro owner but my son has an Atari and I quite often dialle on his machine. I am used to having a flashing cursor on the screen so I came up with this routine to put one on the line.

I've had a great deal of use and the routine seems to be the only one without — P. Jones, Bradford, Yorks.

■ Thanks for your offering. When testing it we also noticed that any lowercase letters were also blanked there quite rarely which should give readers a hint about what you're doing.

If you want to make this into a subroutine, don't forget

```

10000 REM:ERASECURE
10000 REM:SETUP
10010 IF 0=1 THEN GOTO 10010
10020 POKE 10040,0:GOTO 10020
10030 IF 0=0 THEN GOTO 10010
10040 " "
10050 REM:END
10060 REM:
10070 REM:
10080 REM:
10090 REM:
10100 REM:
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10130 REM:
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